

# THE DOCK & HARBOUR AUTHORITY

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## Editorial

### *The Port of Cherbourg, France.*

The Port of Cherbourg, which is situated about midway along the English Channel, is well known as the French port of call for Transatlantic liners, but owing to the slump in recent years of Transatlantic travel, the port's traffic has naturally dropped off considerably. Notwithstanding this material decrease in passenger traffic, the Port of Cherbourg has in recent years carried on extensive developments to further increase the facilities of the port for large liners, and it will be found, that when the Transatlantic traffic does resume normal activities once again, Cherbourg will be in a better position than ever to handle the large liners calling there.

The extensions to the Port of Cherbourg have been carried out in two sections, the first of which was begun in 1923 and completed in 1927 and comprised the construction of a mole with 600 metres of effective quayage and the construction of a jetty known as Flemings' Jetty. The second section, which was put in hand in 1928, comprised the construction of deep-water berths for liners; the construction of a modern marine station, having direct rail connection with the main line from Cherbourg to Paris; the construction of a second mole with a deep-water quay on one side; and an extensive dredging project. Most of the second section of the work is now completed.

The chief traffic at the Port of Cherbourg is the transport of Transatlantic passengers, and an illustration of the way this traffic has dropped in recent years is shown by the fact that in 1929, the number of Transatlantic passengers using the Port of Cherbourg was 181,065, and this number had decreased in 1934 to 38,716. There has also been an appreciable decrease in the number of passengers to and from European ports in recent years.

An illustrated article on the Port of Cherbourg by M. D. Fleury, Ingénieur des Ponts et Chaussées, appears on another page, and Cherbourg also forms the supplement for this month's issue.

### *London's Shipping: Last Year's Increase.*

Shipping statistics just published for the year ended 31st March, show that the tonnage of vessels which arrived at and departed from United Kingdom ports totalled 344,564,335 n.r.t., an increase of 1.5 per cent. over the previous year. London dealt with 58,895,021 n.r.t., an increase of 2.5 per cent. Liverpool, 33,641,132 n.r.t., an increase of 1.4 per cent., and Southampton 23,451,019 n.r.t., a decrease of 5.7 per cent. London's percentage of the total for the United Kingdom was 17.1, Liverpool 9.8, and Southampton 6.8 per cent.

Cargo handled in the Port of London, including imports, exports and transshipments, amounted to 39,284,779 tons, an increase of 2,516,161 tons over the previous year.

### *New Ellesmere Port Lay-bye.*

There has just been constructed at Ellesmere Port, for Bowater's Mersey Paper Mills, Ltd., a new 1,000 ft. wharf, which is used mainly by steamers discharging wood pulp. Here there was recently discharged 1,500 tons of wood pulp in a space of 8½ hours. The work of constructing the wharf, which is 80 ft. wide, was commenced in October, 1933, and advanced so far that in November of last year berthage was available for steamers. The wharf is constructed of reinforced concrete counterforts on piers which are carried below the level of the lay-bye, the counterforts being spaced at distances of 33 ft. and keyed into red sandstone.

Five electric wharf cranes have been installed and these can travel the full length of the wharf. The cranes are arranged for use as grabbing cranes and as ordinary cargo cranes. Each has a maximum radius of 56 ft. and a minimum radius of 18 ft. 3 in. The weight-lifting capacity is 2½ tons.

The lay-bye, which is situated in close proximity to the paper mill, is excellently served by a railway track which is connected to the service of the London, Midland and Scottish Railway Company.

In our next issue will be published a fuller description of the wharf with illustrations of some of the equipment.

Ellesmere Port is situated near the entrance to the Manchester Ship Canal and this particular wharf may be said to be the first after entering the Ship Canal at Eastham and approaching in the direction of Manchester. It is anticipated that the imports of wood pulp at Ellesmere Port during the normal working year will exceed 200,000 tons.

### *Manchester Ship Canal.*

Manchester Ship Canal Company traffic returns for April were £110,142, against £89,455 in March, and £100,013 in April last year. The figure is the highest for any month since December last year. The total for the first 4 months of this year shows an increase of £3,177 in the traffic receipts as compared with the corresponding period of 1934, and one of £17,474 as compared with the corresponding period of 1933. The increase suggests that the Port of Manchester is more than holding its own in competition with other ports.

### *Improvement in Iron and Steel Shipments from River Tees.*

The notable improvement being made in the iron and steel industry is clearly shown in the fact that shipments in iron and steel from the River Tees in April constituted the heaviest tonnage since April, 1931. Examination of the returns shows that export shipments had increased over 15,000 tons, compared with March, more than making good the decrease of 7,000 tons in the coastwise shipments. The total shipments in April amounted to 55,471 tons, compared with 47,894 tons in March, but April was one day shorter, and included the Easter holidays, making the improvement all the more remarkable. Russia with heavy acceptances of steel plates, and Canada reappear in the list of countries to which manufactured steel has been shipped during the month.

### *The Port of Gloucester.*

The Port of Gloucester have recently issued their annual report for the year ending 31st December, 1934.

The result of the year's working showed a big improvement on the previous year inasmuch as the total quantity of goods imported amounted to 675,968 tons, as compared with 586,754 tons in 1933, and the exports for 1934 amounted to 32,843 tons, as compared with 22,424 tons in 1933.

The receipts for the year under review amounted to £110,619 19s. 5d., and expenditure £55,725 15s. 4d., which left a balance of receipts over expenditure of £54,894 4s. 1d., which, after deducting interest on Debentures and Debenture Stock, reserve for the redemption of Debenture Bonds, and works and contingencies reserve which altogether amounted to £31,843 11s. 1d., left a balance for disposal of £23,050 13s. 0d. For the purpose of comparison, the receipts for 1933 were £97,377 19s. 0d., and expenditure was £51,856 12s. 10d., which left a balance of receipts over expenditure of £45,521 6s. 2d., and after deducting interest on Debentures and Debenture Stock, etc., etc., which amounted to £25,508 9s. 8d., left a balance for disposal of £20,012 16s. 6d.

## Notes from the North

### Rat Prevention on Quays and Wharves.

**T**HE method adopted at Liverpool to render wharves and warehouses rat-proof is dealt with in the annual report of the Medical Officer of Health to the Port Sanitary Authority by Dr. W. M. Frazer.

He explains that with the exception of a few of the old docks in the central district, the wharves on the dock estate are of rat-proof construction, made with ferro-concrete and stone. The roadways and pavings of the sheds are set on a concrete foundation. The sheds are built of brick and reinforced concrete. All sheds in the new Gladstone Dock are constructed solely of reinforced concrete, and there are no ledges, beams or angle iron on which rats may run. All offices and wooden huts in the sheds are made rat-proof either by being lifted 18 in. clear of the ground or sheathed with iron or cemented round the base. New offices or other buildings are either built on brick or concrete piers clear of the ground or the base is built hard and close to the paving of the shed.

The Mersey Docks and Harbour Board and the various shipping companies are fully alive to the necessity and benefit of rat-proofing, and practically all sheds, huts, offices and warehouses on the dock estate have now been made rat-proof. Constant supervision is required, however, in the case of stores, otherwise they tend to become harbourages for rats.

It is the duty of the sanitary inspectors to see that all stores are kept clean and tidy and that no rubbish is allowed to accumulate. Old rope, dunnage, wood, etc., must be stacked neatly on platforms raised 18 in. from the ground, and the space beneath the platform must be kept clean and free from rubbish.

Of course, special measures are taken to prevent the passage of rats between the ship and shore. All vessels, with the exception of coastwise vessels, must have rat guards affixed to their moorings during their stay in the port. The rat guard used and approved of by the Port Sanitary Authority consists of a disc of galvanised sheet iron 1/16th in. thick and 3 ft. in diameter. The edge is left raw, i.e., not wired or turned over. In the lower half is cut a door, hinged and so fastened when shut that no foothold is afforded to rats. The door slit leads to the central hole through which the rope passes. Round the central hole is placed a strong collar projecting about 4 in. on each side and riveted to the disc. In the collar is a strong steel spring clip, which can be adjusted by means of a winged nut and bolt. To apply the guard, the door is opened and the guard put over the rope so that the latter passes up into the central hole, where a little force is necessary to overcome the spring of the clip. The guard will now hold quite firmly and the bolt and screw closing the opening of the clip gives additional security. The door is then closed and fastened, the upper edge being fitted with a piece of thick sheet rubber attached, so as to close completely the central hole whatever the size of rope in use.

A rat guard to be effective should be placed at the ship end of the mooring and as far as possible away from the ship's side. When vessels loaded with cargo are infected with either human or rodent plague the following procedure is adopted in order to prevent the passage of rats from the ship to the shore:—If the vessel is loaded, a preliminary fumigation may be undertaken to destroy the rats, the nature of the cargo would, however, determine whether this procedure should be followed. The measures enumerated below are enforced pending discharge of cargo, when a complete and thorough deratisation takes place by fumigation with hydrocyanic acid gas.

- (a) The vessel is breasted off 6 ft. from the quayside.
- (b) Rat guards are adjusted on all moorings.
- (c) One gangway only is allowed and a watchman is stationed there day and night.
- (d) The gangway must be lifted at sunset and not lowered until sunrise.
- (e) The cargo must be discharged under supervision of the Port Sanitary staff.
- (f) Trapping and examination of rats caught in the neighbouring sheds are carried on.

### Mersey Transit Charges.

A further delay has occurred in the negotiations between the representatives of the railway companies, shipping lines and Mersey Docks and Harbour Board in connection with the vexed question to transit charges, the disparity in which has caused one of Birkenhead's shipping lines to transfer to Liverpool.

The chief goods managers of the railways and representatives of the Dock Board and shipping lines met recently, and the question was fully discussed without any decision being arrived at. Another meeting, therefore, will be held in a fortnight's time.

### Morpeth Dock Alterations.

Mersey Docks and Harbour Board has carried out alterations at Morpeth Dock for the penning of sheep and has opened the new section of the lairages at Birkenhead. The sheep and cattle trade is now centred in the one lairage. It is hoped there will be a great accession of new business.

### Mersey Pilotage.

Mersey Docks and Harbour Board and the Liverpool ship owners have received with surprise the decision of the Board of Trade rejecting the proposal of the shipowners for the abolition of the Point Lynas Pilotage Station of the Dock Board. The Board of Trade has submitted a scheme of re-arrangement of the Liverpool pilotage district for consideration, designed to meet the legal and practical difficulties revealed at the enquiry held in October last, and the possible abolition in the future of the Point Lynas Station should experience justify it.

The Liverpool Steamship Owners' Association have long contended that the Point Lynas Station could with safety be dispensed with, and it was computed that its closing would save approximately £18,000 a year. The shipowners claim that arrangements could be made at the Bar which would enable pilotage to begin and end there without difficulty or danger.

### Master Portage.

Mersey Docks and Harbour Board has amended the master portage rates for sugar discharged in the docks of the Board, when the quantities amount to 1,500 tons or over in any one cargo. It has been decided that the rates for such sugar shall be subject to a deduction of 10 per cent. This also applies to sugar chargeable under the classification tables. A substituted regulation has already been submitted to the Ministry of Transport and if no objections are advanced will become operative as from 17th June.

### Ribble Training Walls.

Some interesting facts about the Ribble, since the Ribble Navigation Authority, which is controlled by the Preston Corporation, took it in hand, have been collected by Mr. A. H. Howarth, the Ribble Engineer. The use of training walls, which eventually will extend 16 miles out to sea from the dock (Lytham is approximately 11 miles distant), has led to a lowering of the river bed in the navigable channel to a remarkable degree. Even so recent as 1910, the average height of the river bed was 4.284 ft. above low water, whereas to-day it is .969 ft. below low-water mark. In other words, in 25 years the river has been deepened 5 ft. 3 in. along the whole length from Lytham. The water has been deepened by no less than 10 ft. 8 in. since 1883. On the seaward side of Lytham, the water area between the training walls is being gradually widened and deepened, due to the tidal and upland waters constantly flowing up and down the regulated channel. Between 1910 and 1934, 129 acres which were sand at low tide have been displaced by water. The average depth of the 360 acres of water between the walls was 4 ft. 9 in. To-day there are 489 acres of water with an average depth of 10 ft. 9 in.

### West African Harbourage Matters.

In the annual report of the Liverpool Chamber of Commerce in the section dealing with Nigeria, it is stated that the Governor had declared in reply to a communication addressed to him, that an investigation was being made of the co-ordination of all services, and the facilities at the railway ports of Lagos and Port Harcourt, under one authority with a Port Advisory Board. There was no proposal or intention to hand the marine department over to the railways.

The Lagos Chamber of Commerce has intimated that they had already advised the Government that they agreed to the principle of co-ordination of the services, provided no increase was made in the charges to shipping, etc., but that they would require detailed data before passing constructive criticism. The changes would not be made without the sanction of the proposed Advisory Board on which all interests would be represented, but the scheme was still definitely only in embryo.

The report also mentions that the Nigerian Government, in reply to representations, had stated that they maintained that the channels used by ocean-going steamers in the waters of Nigeria were as well, if not better marked than those of any other country in a similar stage of development, and having regard to the amount of traffic involved. The bar channel at Forcados was surveyed every fine weather season and the buoys rearranged whenever the result of the survey indicated that such action was necessary. It was not considered by those with knowledge of local conditions, feasible to buoy the innumerable sand bars and crossings on the Niger, Benue and Cross rivers, which were constantly liable to sudden changes from causes impossible to foresee.



*Notes from the North—continued***Dock Toll Bridge.**

It now appears likely that the toll on the Penny Bridge, which acts as a connecting link between Birkenhead and Wallasey, will be lifted shortly. Negotiations have been proceeded with between representatives of the Mersey Docks and Harbour Board and Birkenhead and Wallasey with a view to the liberation of the bridge and road, and meeting the cost of upkeep and maintenance. The difficulty has been alleviated somewhat by Mr. Hore Belisha, the Minister of Transport, announcing that he is willing to make grants to free existing toll roads and bridges.

The removal of the toll will mean the speeding up of traffic between the outskirts of Birkenhead and Wallasey and will relieve to a certain extent the traffic which at present makes use of the Duke Street bridge.

**Preston Dock Traffic.**

A record total of imports and exports at Preston Dock during the past twelve months was reported at the last meeting of the Preston Town Council. Ald. Lucas, who made the announcement, in presenting the minutes of the Ribble Committee, said that for the first time the total had reached one million tons. He added that they hoped to be able to keep up the record, but prophesying on the future of the dock was like prophesying a Grand National winner. Ald. Lucas briefly referred to the fact that Messrs. J. W. Baird and Co., Ltd., one of the largest timber importers in the country, had taken a piece of land, containing 11,026 square yards, for the purpose of storing pit wood. The company had promised to import during their first year 24,000 tons of cargo, and the committee were hoping they would settle down and eventually discover that they wanted considerably more land.

**Caernarvon Harbour Trust.**

Sir William Vincent has been elected chairman of the Caernarvon Harbour Trust. Included in the minutes of the Works Committee was a recommendation regarding the correspondence between the Trust and the Board of Trade with reference to the removal of sand from the banks of the Merai Straits. It was decided to take no further action in the matter.

**River Dee Navigation.**

Flintshire County Council has declined to appoint representatives to go to London, but has agreed to appoint representatives to attend a conference of local authorities and bodies concerned to discuss a scheme for the development of the navigation of the River Dee by the improvement of the channels of the river between Flint and Chester. The Council was asked by the Dee Conservancy Board to appoint representatives to a deputation which is to wait upon the Minister of Transport and the Board of Trade regarding the matter. Among those whose representation on the deputation is sought are the Cheshire County Council and the Chester Corporation.

Ald. Thomas Waterhouse questioned whether the deputation knew what they were going to London for, whether to discuss a £40,000 or a £400,000 scheme. It was a most difficult subject, he said. Many considered it was no good just tinkering with this question, and if they were going in for a scheme it should be such as would give employment to a large number of men now unemployed and should make the river a navigable one. He was opposed to any members of the Council forming a deputation from other bodies until they knew definitely what was the object.

## Clyde Navigation Trust

### *Navigation of the Clyde    An Extensive Improvement Programme    Proposed Unification of Control*

THE fact that several vessels when leaving the port laden had grounded in the river and that in consequence one line had transferred its sailings to Liverpool, was emphasised in support of an extensive programme, costing approximately £700,000, for widening and deepening the river and improving the docks and harbour facilities, which was under consideration at a meeting of the Clyde Navigation Trustees in Glasgow, on May 22nd.

The subject was raised some time ago by the City Treasurer, Mr. P. J. Dollan, and, in addition to a memorandum explaining the proposals in detail, the Committee on New Works and Maintenance of Harbour and River had before them a report upon the project by the general manager. After due consideration, the Committee recommended that further consideration be given to the reconstruction of Lancefield Quay and the improvement of Kelvinhaugh Wharf, but that no action should be taken otherwise.

Mr. R. T. Moore, convener of the New Works Committee, in moving the approval of the minutes, said he thought they were all satisfied that the Trustees had consistently kept pace with the navigation requirements of the river, and had from time to time improved the conditions of the river and the harbour so as to meet all claims. One of the improvements effected in recent years was that the water had been deepened by 10 ft., from 15 ft. to 25 ft. at low water. That had necessitated the strengthening of some of the quays, and that had been done. They were at present engaged on work at Anderston Quay, and when that was completed they would proceed to strengthen Lancefield Quay at a cost of about £160,000.

**Officials' Views.**

The Chairman, Mr. W. F. Robertson, who seconded, said he thought some of the suggestions put forward by Mr. Dollan for expert consideration were a little critical of the Clyde Trust administration or of the port's ability at present to handle its traffic. The general manager and other officials had replied that they were unable to find that that criticism was well and substantially founded.

The report by the manager, he proceeded, dealt with various suggestions regarding the deepening and widening of the Clyde, and it was agreed that such work required to be done at some time, but nowhere in the report was it suggested that it was necessary now. He pointed out that in recent years the Trustees had spent a great deal of money in reconstruction, modernisation, and in new construction work, including the King George V. Dock, for which they had no real need at the moment.

Further, they had widened the river opposite Clydebank. They had other improvements in hand in connection with the

equipment of ferries, dredging plant, etc., and the latter items involved something like £12,000. The minutes before them suggested that they should go ahead with work involving about £180,000, or a total of £300,000. In view of the fact that they had had deficits during the past two years, he thought that sum was about as much as they could face.

**Unification of Control.**

Mr. Dollan moved that, in addition to the plans for the reconstruction of Lancefield Quay, and the improvement of Kelvinhaugh Wharf, a long-term programme be prepared for the widening of the river at Renfrew, Dalmuir and Erskine, and that the Trustees approach the Clyde Lighthouses Trust with a view to securing the unification of control of the river. He thought they were all unanimous that the proposals made in the memorandum would require to be proceeded with by the Clyde Trustees. The majority of the members took the view that the present time was not the most opportune for proceeding with the schemes because of the large expenditure involved, whereas the minority were of the view that the present time was the most opportune in the history of the Clyde Trust for the past 25 years.

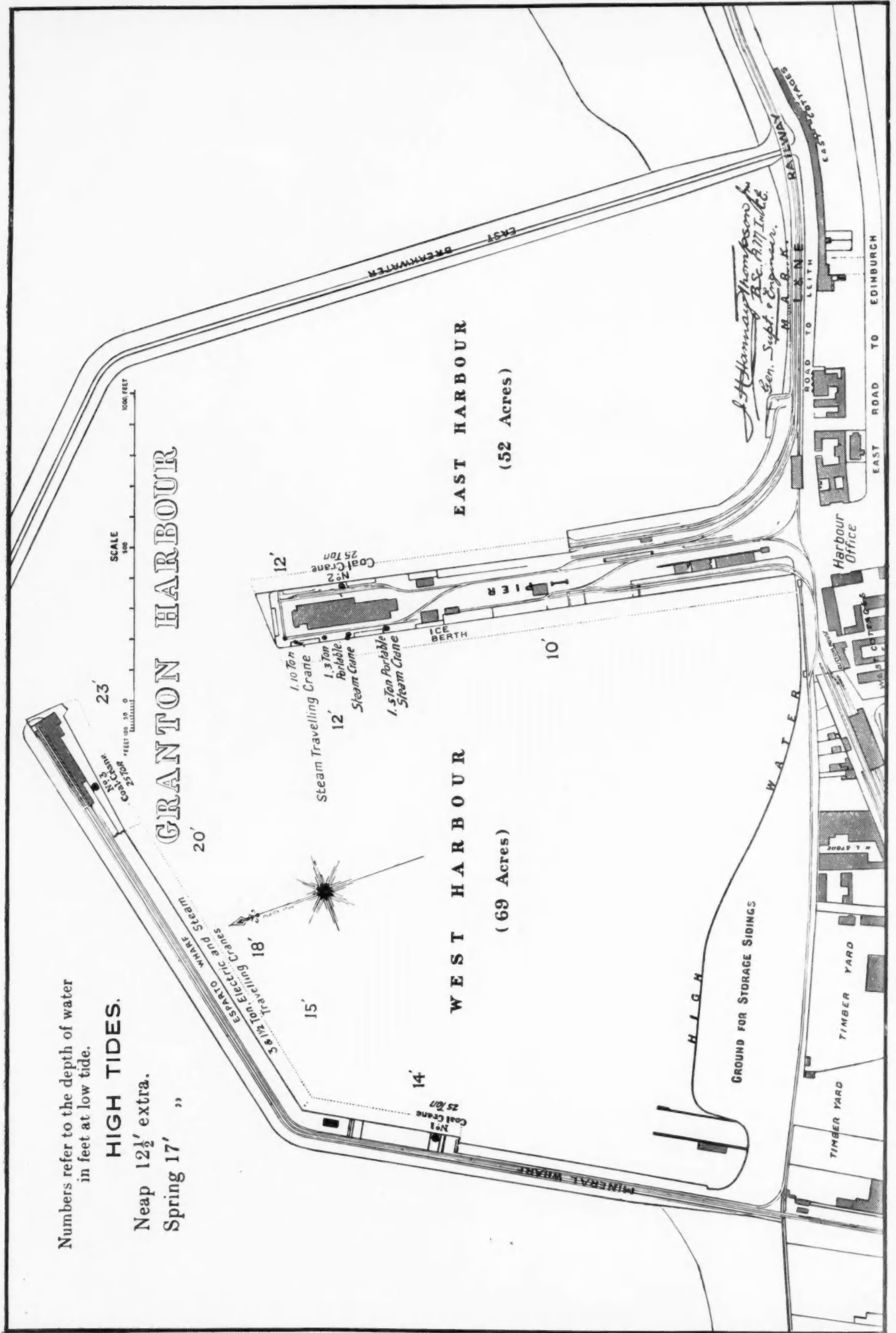
Mr. McCraig, speaking in support of the proposal to widen and deepen the river, recalled that several laden vessels had grounded when leaving the port, and he knew of one line which had transferred its sailings to Liverpool as the result of such a mishap to one of their ships.

The Chairman thought it would be advisable to delay action in regard to approaching the Clyde Lighthouses Trustees regarding the question of unification of control of the river.

On a show of hands the minutes were carried by 23 votes to 9 for Mr. Dollan's recommendations.

**Dry-docking Facilities.**

A notice of motion given by Mr. Dollan at the previous meeting was unanimously remitted to the General Purposes Committee with Mr. Dollan for consideration and report. The motion recommended that in view of the unfortunate position of D. and W. Henderson and Co., Ltd., Meadowside Shipyard, Partick, and the likelihood of the closure of the firm, a special committee be appointed to consider the future of the dry-docking facilities, and, if thought advisable, to acquire them. Further, that the special committee consider the taking over the sites of the shipyards which have come under the restrictive covenant of National Shipbuilders' Security, Ltd., especially on the upper reaches of the river, with a view to their use as centres for new industries or for the development of the river generally.



Plan of Granton Harbour.



## Granton Harbour, Edinburgh



*General View of West Harbour.*

### *Growth of Granton Harbour.*

THE advantages afforded by Granton for the construction of berthage facilities were originally recognised in the year 1834 by Mr. R. W. Hamilton, manager of the General Steam Navigation Company, who, in view of the great increase in the number of passenger steamers plying to the Forth, had for some time realised the necessity of providing a landing-place at which passengers could disembark at all states of the tide. Mr. Hamilton's views were communicated to the Duke of Buccleuch, who held, along with the property at Granton, the rights of foreshore and harbour. Evincing immediate interest in the scheme, instructions were issued by His Grace to have the necessary estimates and reports prepared. These were submitted to and approved of

by a meeting of "mercantile and nautical gentlemen," held in Edinburgh, under the presidency of Admiral Sir David Milne, and His Grace, convinced of both the practicability and necessity of the proposed undertaking, intimated that he himself would bear the entire expense of the works.

Operations were accordingly begun in 1835 on the construction of "a proper and sufficient pier extending below low-water mark." The first portion of this pier was opened on the day of Queen Victoria's coronation (28th June, 1838), the opening, according to a report, "being attended with great festivities." The next memorable event in the history of the undertaking was the landing of the Queen and Prince Albert on the occasion of their first State Visit to Scotland on 1st September, 1842.

Section by section the further construction of the work proceeded, each section being opened on completion, and in 1844 the pier was finished to its present extent of 1,700 ft. in length and 180 ft. in width, providing altogether 3,200 ft. of quayage.

Before the pier was completed, His Grace, who had taken a great personal interest throughout the development of the structure, had decided on proceeding with a much greater scheme than that originally intended. An Act of Parliament was obtained for "the construction of two breakwaters enclosing in the embrace of their elbows an expansive sheet of water and thus providing a safe, commodious and accessible harbour."

His Grace assumed entire financial responsibility for the scheme; in fact, the material for the construction of the breakwaters was obtained from His Grace's quarry on the Granton Estate. So efficiently was the work carried out that practically no further outlay has been required for the repair to these breakwaters.

From time to time throughout the century the berths at the Middle Pier and Western Wharf were widened and deepened, and suitable wharfage accommodation was constructed and equipped with steam cranes of up to



*The Middle Pier.*

## Granton Harbour, Edinburgh



*Deep-water Coaling Berth.*



*Transit Sheds and No. 2 Coaling Crane.*



*25-ton Coaling Crane.*



*Trawlers at Middle Pier.*

*Granton Harbour, Edinburgh—continued*

25-tons capacity for the handling of the rapidly increasing trade.

At the outbreak of the Great War part of the harbour was immediately utilised by the Government as a base for mine-sweepers. The many facilities afforded by the port and the advantage of a harbour which vessels could enter and leave at practically any state of the tide, were quickly recognised, with the result that the Admiralty finally took over the whole harbour to accommodate the large concentration of mine-sweepers, patrol vessels, submarine destroyers, and other auxiliary craft. After the cessation of hostilities the Admiralty Staff was withdrawn and the port resumed its customary commercial activity.

Early in 1932 a change took place in the management of Granton Harbour, as it was transformed into a Private Limited Liability Company. An extensive programme of reconstruction was entered upon, and the first stage, the reconstruction of the timber Esparto Wharf, 45 ft. wide and 1,000 ft. long, has just been completed, and the equipment augmented by four 3-ton electric travelling cranes of 40-ft. radius.

The main fish-landing quay at the Middle Pier has also been completely re-built, while considerable alterations to the railway sidings have been made.

Further schemes for permanently deepening certain of the berths and providing improved facilities for the loading of coal, are also under consideration.

**Trade and Facilities.**

The Harbour of Granton is situated within two miles of the centre of the City of Edinburgh, and, alone of the Forth ports, is tidal, there being no dock gates. This enables coasters and lighters drawing up to 13 ft. of water to enter and leave the harbour at all states of the tide, while vessels drawing up to 30 ft. of water can enter and leave at high water.

The harbour consists of a Middle Pier protected on the east and west sides by two breakwaters, thus forming two harbours, the west containing 70 acres and the east 52 acres of water at H.W.O.S.T. The West Breakwater is lined with timber wharves and has just been equipped with a battery of 3-ton electric travelling cranes to augment the existing quick-acting steam cranes of three and five tons capacity.

The present-day imports consist mainly of esparto grass, wood-pulp, and other paper-manufacturing materials; motor spirit, asphalt, timber, strawboards, bog ore, nitrate, and general merchandise. Granton has been for many years, both pre- and post-War, the principal esparto importing port in the British Isles, and the growth in recent years of the paper-making industry in the Lothians and surrounding counties has resulted in an increasing yearly quantity of esparto being landed at the harbour.

The exports comprise principally coal, coke and coke breeze, along with bricks, oil, castings, machinery and general goods. Coal, both for coastwise and foreign shipment, is chiefly obtained from the nearby Lothian coalfields, although a con-



3-ton Electric Cranes at Esparto Wharf.

siderable quantity is also forwarded from the Lanarkshire pits. Practically all the coke exported from the Edinburgh Corporation Gasworks, which is situated close to the harbour, is handled at Granton and is shipped principally to Denmark, Sweden, and Germany.

The coal and coke exports are handled at wharves at the Western Breakwater and the Middle Pier. Two 25-ton coaling cranes, capable of shipping up to 300 tons of coal per hour, are situated on the West Breakwater, and each has extensive siding accommodation for the storage of wagons. A third 25-ton coaling crane of similar capacity is placed on the Middle Pier where there are other steam cranes with lifting capacities varying from 3 tons to 10 tons for general cargo.

All the berths in the harbour are connected up with the London & North-Eastern and London, Midland & Scottish Railways, and there is extensive siding accommodation adjoining the harbour for the standage of coal and other traffic. Access to all the berths may also be had by road, and cargoes may thus be discharged direct into motor lorries. Great advantage is taken of the conveyance of goods by road transport, as it is possible to convey goods by road to the outlying districts of Edinburgh without the necessity of going through the centre of the City.

Vessels drawing up to 21 ft. of water can be kept afloat at all states of the tide, and up to 25 ft. of water at neap tides, as the depth of water at the Western Wharves varies from 15 to 23 ft. at L.W.O.S.T. Vessels of from 2,000 to over 8,000 tons gross are regularly berthed at these wharves. At all the berths fresh water is procurable from pipes connected up with the Edinburgh Corporation's water mains.

On the land adjoining the harbour, which is also the property of the Company, several important industries are carried on, the principal of which are:—

Wire works, printing ink and oil refining factories, iron foundry, ice factory, net factories, sawmills, and timber yards. There are also a number of workshops occupied by engineers, boat repairers, riggers, etc., adjoining the harbour, thus providing local facilities for executing smaller repairs to shipping.

Both Edinburgh and Leith are within easy reach of Granton, either by train or tramway. The converging of several arterial roads on Granton renders the port very accessible and convenient for road transport to surrounding districts.

**Coal and Coke.**

The coal and coke exports are handled by the 25-ton coaling cranes, which are capable of shipping up to 300 tons of coal per hour. Two of these cranes are situated on the Western Wharf and the third on the Middle Pier. Each has extensive siding accommodation for the storage of wagons, enabling vessels carrying up to 4,000 tons of coal to be loaded without delay.

The 3-ton electric travelling cranes are fitted with grabs which are designed for the bunkering of trawlers and small vessels.



Esparto Wharf.



**Granton Harbour, Edinburgh—continued**

The work of coaling steamers is carried out from 6 a.m. to 10 p.m., while the work of coaling trawlers is carried on until 11 p.m. by the large cranes, or at any time of the day or night by the electric or small steam cranes. The work of trimming steamers is carried out under tariff conditions from 6 a.m. to 10 p.m., while the trimming of trawlers is carried on until 11 p.m. at the large cranes or at any hour when required, by means of the small cranes or baskets.

The railway rate on coal and coke for shipment at Granton is an f.o.b. rate, including both the cargo dues and the crane dues, and no further charges in this respect are therefore payable by the shipper.

Two 35-ton self-indicating weighbridges have just been installed for the weighing of rail and road traffic.

**Mineral Oil.**

In 1909 the Anglo-Saxon Petroleum Company opened a depot on the Granton Estate. A pipe line has been laid from this installation to the deep-water berth so that petrol and crude oil can be pumped direct from the vessel to the installation.

The installation, which now belongs to Scottish Oils & Shell-Mex, Ltd., has a tankage capacity of 2,250,000 gallons, and it is utilised for the storage of the various grades of motor spirit, such as Shell, Aviation, B.P. Ethyl, etc., which is received in ocean tankers.

The motor spirit is delivered in rail tank cars and motor vehicles fitted with tanks, also it is packed into barrels and the standard 2-gallon can. There are facilities available which enable many thousands of these cans to be filled each day. These are delivered in rail trucks or motor trucks.

Considerable quantities of Mexphalte are stored here. This is used in the construction or reconditioning of roads, also by cable manufacturers, and others who incorporate it in their products.

Many of the grades of Mexphalte are manufactured in Scotland, and some of them can be delivered hot in insulated rail tank cars or road vehicles. Mexphalte is also distributed in various packages, these being delivered in rail cars or motor vehicles.

The installation has extensive rail siding accommodation, and is provided with a road which is suitable for the largest motor-driven road vehicles operating in the petroleum trade.

**Trawling.**

Granton is the headquarters of the fleet of trawlers operating in the North Sea from the Firth of Forth. Between 300,000 and 400,000 cwts. of white fish are landed annually, over half of which is dispatched to the Glasgow market by motor-lorries and special fish trains which run daily.

The commencement of the trawling industry, which took its rise about 1885, found the Granton and Newhaven fish salesmen wide awake to the future of the trade, notable amongst

whom were Mr. John S. Boyle and Mr. Thomas L. Devlin, whose family still take a prominent part in the industry. The fleet at Granton consists of over fifty vessels, and there is a large repairing establishment quite near the harbour, for serving the needs of all vessels.

It is very gratifying that the local owners are increasing their fleets, showing that the industry is making headway in spite of the present difficult times through which it is passing.

The accessibility of the harbour at all states of the tide and the proximity of the Lothian coalfields make Granton Harbour an ideal centre for bunkering vessels. In addition to the local fleet, advantage is taken of the excellent facilities provided for the bunkering of fishing vessels by a considerable and ever-increasing number of trawlers from Aberdeen and other East Coast ports. Plentiful supplies of coal for these vessels are always kept in readiness in the harbour sidings by the local agents, so that, provided the coaling berths are not already occupied, bunkering can commence immediately a vessel arrives.

No port, however well equipped in other respects, would be suitable as a base for the fishing industry unless an adequate supply of ice was available at all times. In this respect Granton is well served.

As long ago as 1906 the Granton Ice Company built a factory at the West Shore Road, Granton, and in 1921 equipped an additional factory on the Middle Pier itself. At the latter, trawlers berth right alongside and the crushed ice is conveyed by means of a travelling belt and chute direct from the factory into the ice holds of the vessel.

Both these factories are thoroughly up-to-date, being equipped with all the latest electrically-driven machinery for the quick and economic handling of the ice. At the West Shore Road factory facilities are available for the rapid loading of lorries with bagged ice for use in the fish market, and for supplying boats which may not find it convenient to come to the chute.

**Statistics.**

The number of ships arrived at Granton Harbour for the past ten years, together with their net registered tonnage and imports and exports are given in the following table:—

Year	No. of Arrivals		Net Registered Tonnage		IMPORTS	EXPORTS
	General	Trawlers	General	Trawlers		
1925	703	3,799	285,629	272,266	177,424	424,022
* 1926	667	3,004	273,118	212,726	207,906	257,705
1927	804	3,167	352,459	247,163	181,175	588,993
1928	798	3,375	327,321	257,469	146,448	594,283
1929	816	3,552	356,919	277,767	166,809	676,725
1930	721	3,891	333,426	309,296	145,746	613,007
1931	614	3,367	320,942	271,811	137,976	673,367
1932	612	3,239	309,383	263,445	123,518	627,451
1933	722	3,217	344,542	258,853	122,873	656,055
1934	752	2,948	366,461	240,102	139,014	696,284

\* General Strike.

**The Port of Amsterdam**

Statistics for the Port of Amsterdam in regard to number of vessels and tonnage and to goods traffic arrived and sailed, as compared with corresponding figures of last year, are as follows:—

**SEAGOING VESSELS AND TONNAGE.**

	ARRIVALS				SAILINGS			
	No.	Per Cent.	N.R.T.	Per Cent.	No.	Per Cent.	N.R.T.	Per Cent.
Mar. 1934 ...	258		400,329		266		381,756	
" 1935 ...	261		389,097		262		383,958	
	+3	+1.16	-11,232	-2.81	-4	-1.50	+2,202	+0.58
Feb. 1935 ...	240		381,208		232		352,494	
Mar. 1935 ...	261		389,097		262		383,958	
	+21	+8.75	+7,889	+2.07	+30	+12.93	+31,464	+8.93
Jan.-Mar. 1934	785		1,153,651		807		1,175,863	
" 1935	739		1,153,112		743		1,148,868	
	-46	-5.86	-539	-0.05	-64	-7.93	-26,995	-2.30

**SEAGOING GOODS TRAFFIC.**  
(In Tons of 1000 Kilos\*).

	1		2		3		4		5	
	Import	Transit incl. in col. 1	Export	Transit incl. in col. 3	Total col. 1 & 3		Import	Transit incl. in col. 3	Export	Total col. 1 & 3
Feb. 1934 ...	320,686	60,280	127,864	56,326	448,550		292,923	62,436	137,709	430,632
" 1935 ...	320,686	60,280	127,864	56,326	448,550		292,923	62,436	137,709	430,632
	-27,763	+2,156	+9,845	+385	-17,918		-27,763	+2,156	+9,845	-17,918
	-8.66%	+3.58%	+7.70%	+0.68%	-3.99%		-8.66%	+3.58%	+7.70%	-3.99%
Jan. 1935 ...	299,322	74,288	161,555	69,315	460,877		299,322	74,288	161,555	460,877
Feb. 1935 ...	292,923	62,436	137,709	56,711	430,632		292,923	62,436	137,709	430,632
	-6,399	-11,852	-23,846	-12,602	-30,245		-6,399	-11,852	-23,846	-30,245
	-2.14%	-15.95%	-14.76%	-18.18%	-6.56%		-2.14%	-15.95%	-14.76%	-6.56%
Jan.-Feb. 1934	615,545	108,174	273,334	87,320	888,879		615,545	108,174	273,334	888,879
" 1935	592,245	136,724	299,264	126,024	891,509		592,245	136,724	299,264	891,509
	-23,300	+28,550	+25,930	+38,704	+2,670		-23,300	+28,550	+25,930	+2,670
	-3.79%	+26.39%	+9.49%	+44.32%	+0.30%		-3.79%	+26.39%	+9.49%	+0.30%

\* These figures have been taken from the monthly statistics of the Central Bureau, The Hague, Holland.

Classified according to flag the number of vessels which entered the Port of Amsterdam during March was: Dutch, 145; Great Britain, 55; German, 24; Swedish, 13; Norwegian, 14; French, 2; Greek, 2; Finnish, 1; Estonian, 2; Jugo-Slavian, 1; Portuguese, 1; Russian, 1.

Vessels laid-up at Amsterdam: 1st March, 1935—16 vessels, measuring 113,287 tons gross; 1st April, 1934—17 vessels, measuring 66,460 tons gross; 1st April, 1935—15 vessels, measuring 109,022 tons gross.

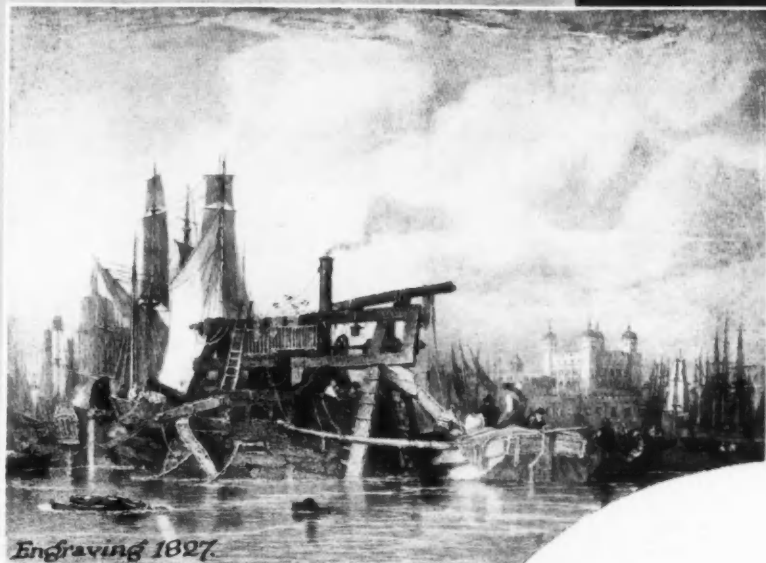
**New Zealand Contract for the Clyde Crane and Engineering Co.**

The Clyde Crane and Eng. Co. of Mossend, near Glasgow, have secured a contract for the supply of 10 cranes, valued at about £40,000, from the Lyttelton Harbour Board, New Zealand.

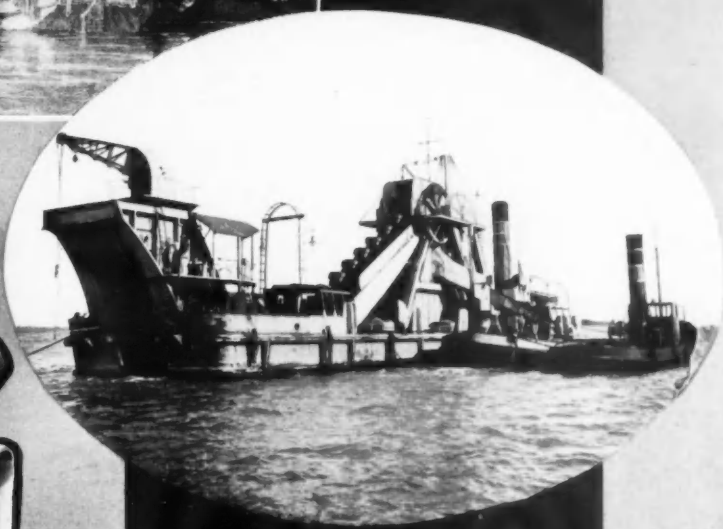
**The Port of Copenhagen.**

The number of ships which entered the Port of Copenhagen during March, 1935, was as follows:—From inland ports 1,150 steam and motor-ships arrived of 188,279 n.r.t., and nine sailing vessels arrived of 2,197 n.r.t. Shipping arriving from foreign ports amounted to 735 steam and motor-ships of 380,266 n.r.t., and seven sailing vessels of 956 n.r.t. The total of steam and motor-ships and sailing vessels arriving from both inland and foreign ports for March amounted to 1,901 vessels of 571,698 n.r.t.

For the month of April, 1935, the number of ships entering the Port of Copenhagen was as follows:—From inland ports 1,222 steam and motor-ships arrived of 186,235 n.r.t., and 11 sailing vessels arrived of 3,110 n.r.t. Shipping arriving from foreign ports comprised 723 steam and motor-ships of 319,316 n.r.t., and seven sailing vessels of 1,073 n.r.t. The total of steam and motor-ships and sailing vessels arriving from both inland and foreign ports for April amounted to 1,963 vessels of 509,734 n.r.t.



1884-



1935



Established 1884.

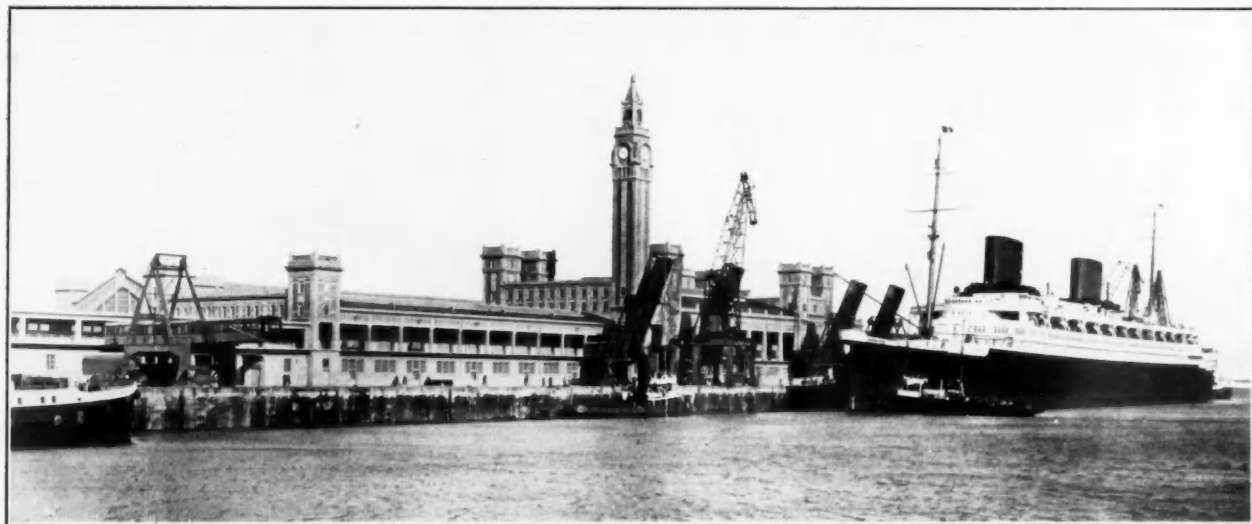
**Tilbury Contracting  
& Dredging Co Ltd**

Tilbury House, Petty France,  
Westminster, London, S.W.1.

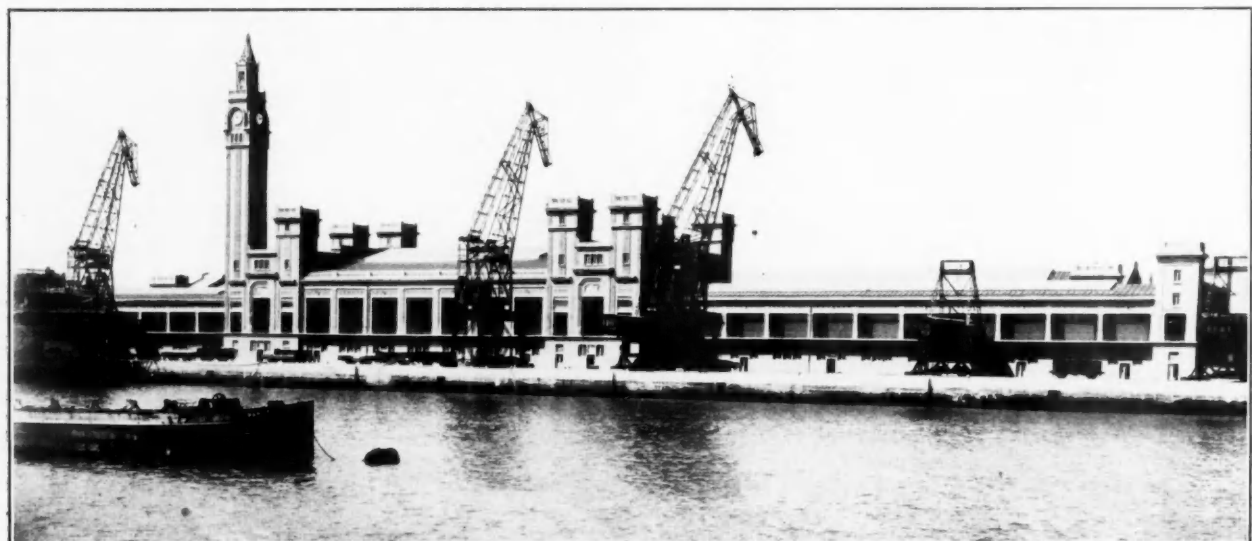
Telephones :— Victoria 2271-2272-2273.  
City Office: 50, MARK LANE, E.C.3.  
Barge Building and Repair Works:  
DREADNOUGHT WHARF, S.E.10

WHEN REPLYING PLEASE MENTION "THE DOCK AND HARBOUR AUTHORITY."

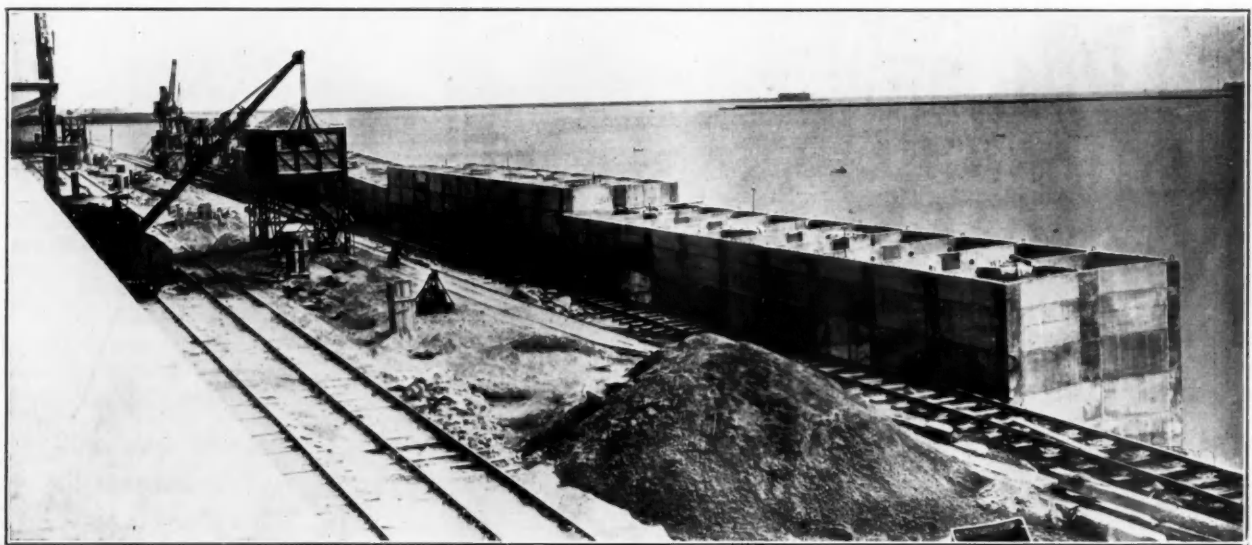
## Port of Cherbourg



*Liner berthed at the Quay of France.*



*East Front of the Main Building of the Marine Station on the Quay of France.*



*Caissons sunk in position.*



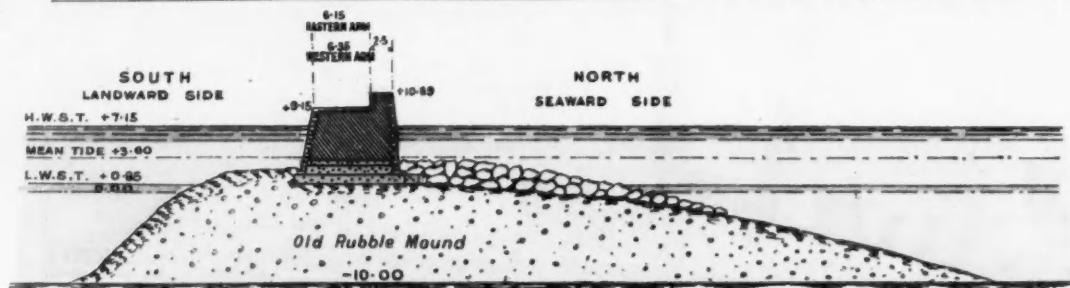
Black Harbor Authority

June 1935

# PORT OF CHERBOURG.

UNDER THE JURISDICTION OF THE MINISTRY OF PUBLIC WORKS, PARIS.

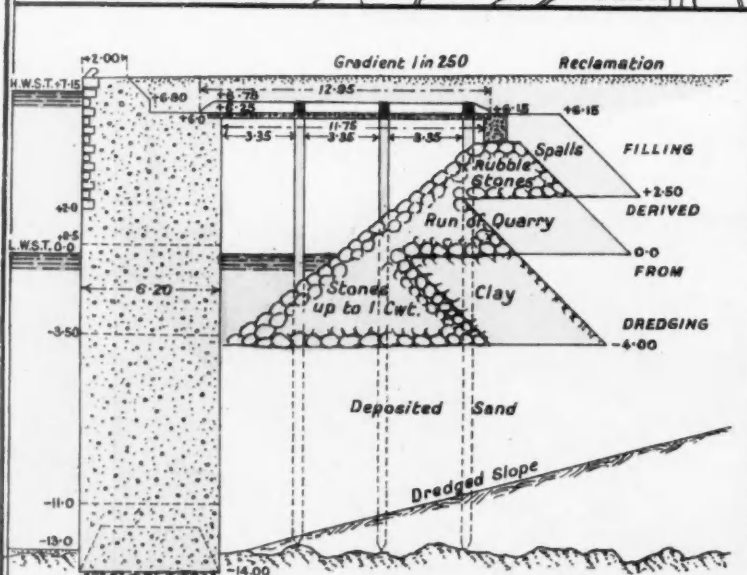
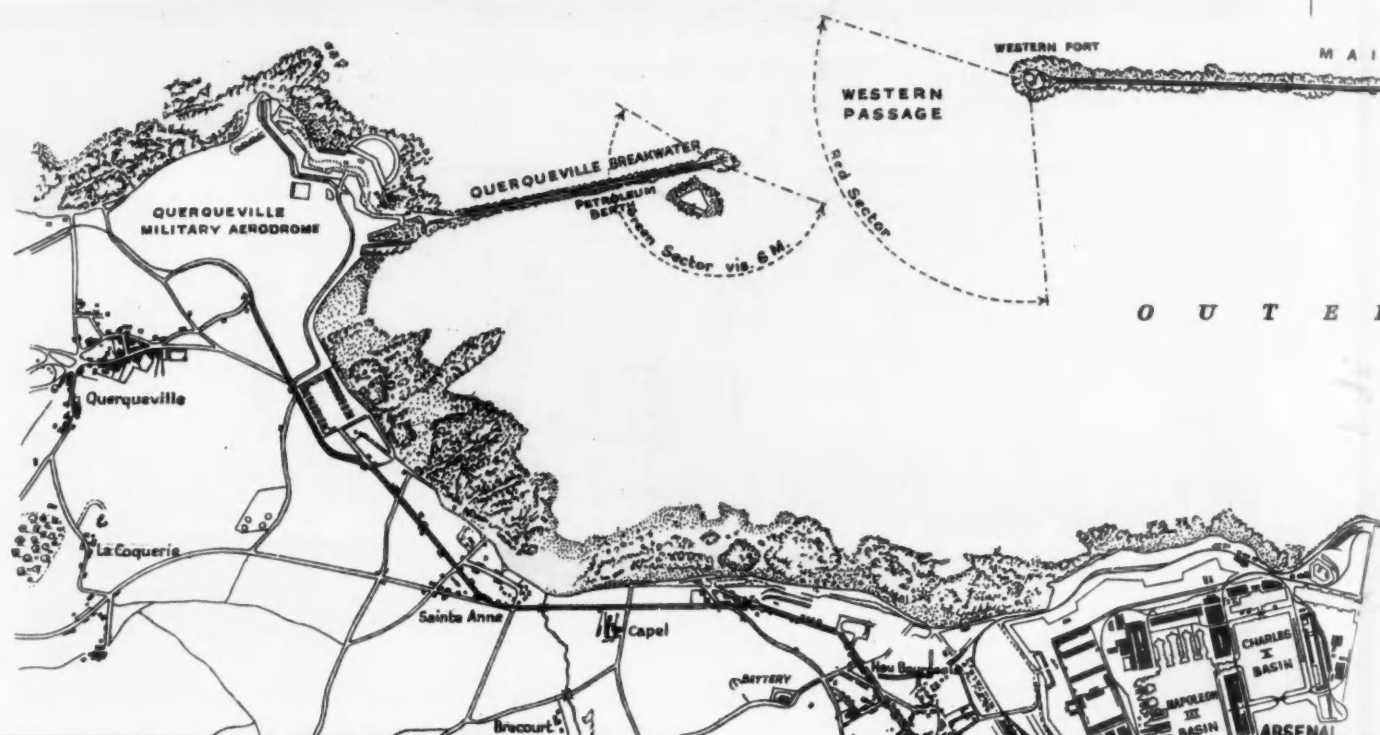
NOTE:— Dock Extensions are col



SECTION OF BREAKWATER.

Scale for Breakwater.

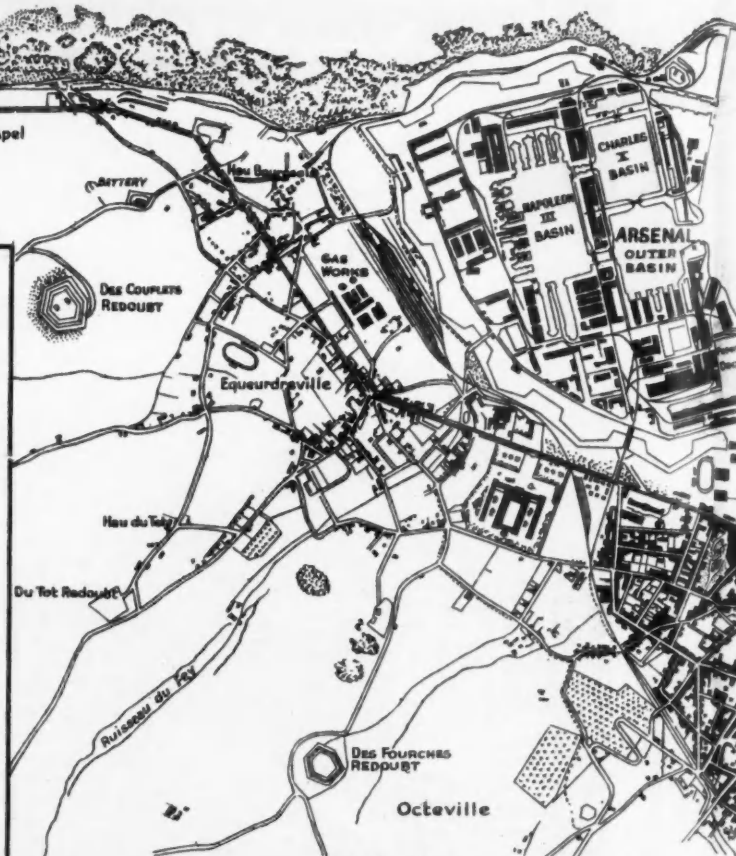
METRES 10 5 0 10 20 30 METRES



TYPICAL SECTION OF EAST QUAY OF THE DOCK.

Scale for Section.

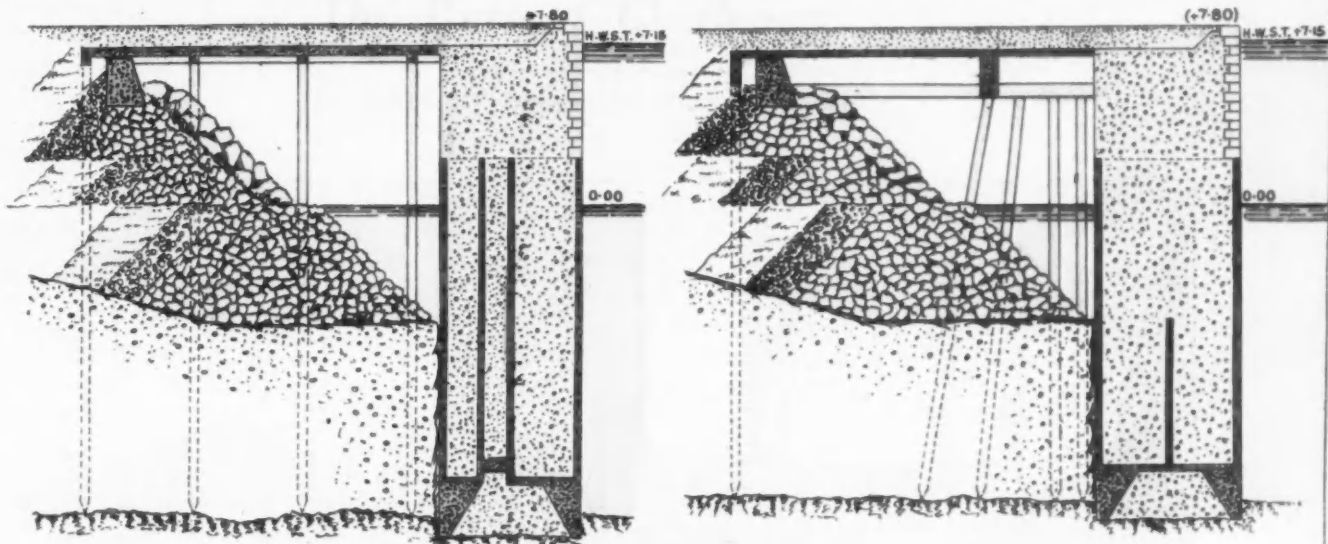
METRES 5 4 3 2 1 0 10 METRES



Scale for Plan.

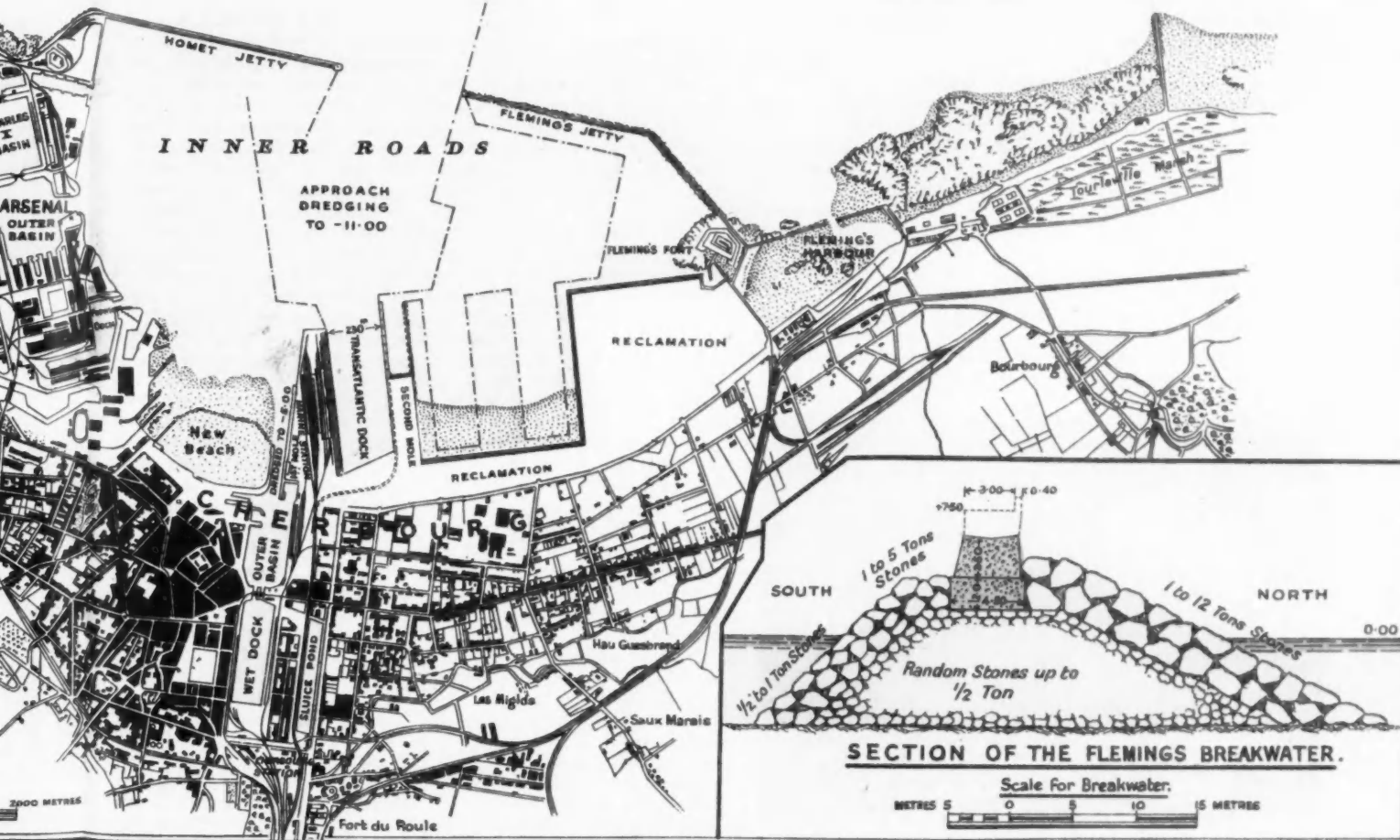
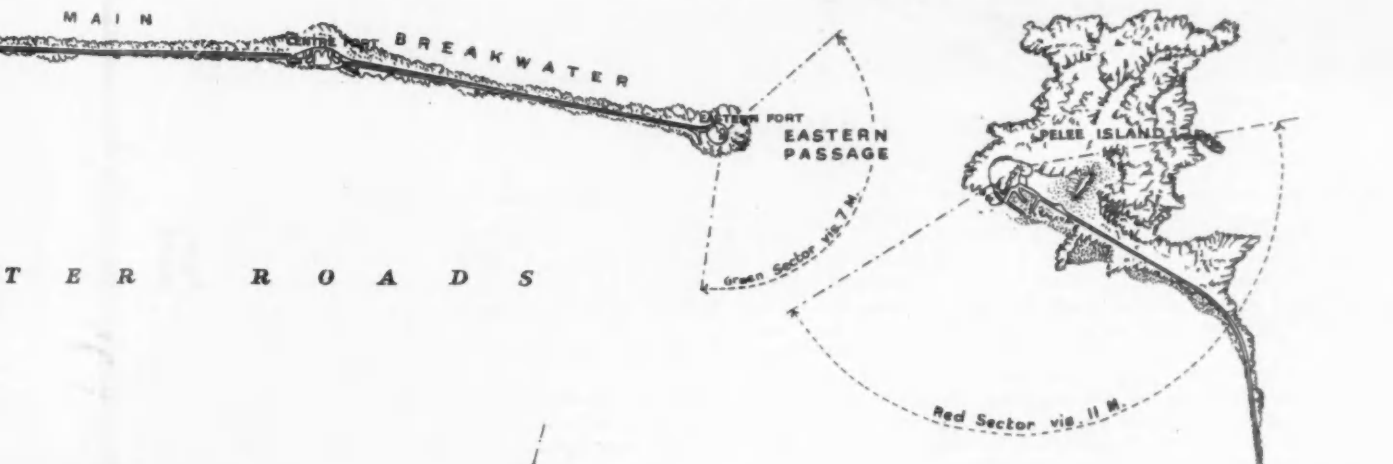
METRES 100 0 100 200 300 400 500 1000 1500 2000 METRES

Extensions are coloured Red



TYPICAL SECTIONS — FRANCE QUAY.

Scale for Sections.

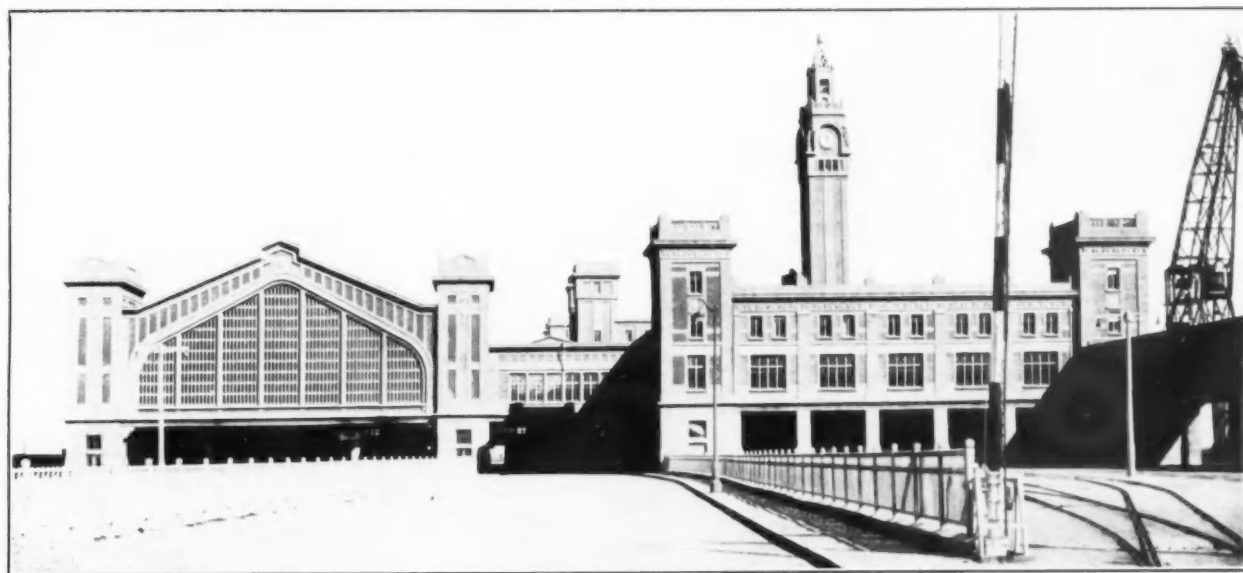






# The Port of Cherbourg

By D. FLEURY, *Ingénieur des Ponts et Chaussées*



*South Front of the Marine Station.*

## I—History of Development

**R**ECORDS of the maritime activity of Cherbourg go back to 1207, when Philippe-Auguste granted to its inhabitants the right of sending a ship to Ireland every year. There was then only a natural haven, consisting in a deep bay which lay in the position now occupied by the wet dock and the ground adjoining it on the East and West.

In the fourteenth century, the only protective work was a very short breakwater, formed near what is now the root of the western breakwater of the outer basin, but from the sixteenth century the entrance channel was defined by small jetties following a North to South alignment.

In the seventeenth century the prime importance of the Port of Cherbourg was recognised by the celebrated engineer Vauban, who proposed to construct a proper inner basin in place of the natural haven which the gradual encroachment of sand had reduced to a mere lagoon traversed by the Divette River. But the port works were not really put in hand until 1738. The port as then formed, for both military and commercial use, comprised two breakwaters, an outer basin, an entrance lock and a wet dock.

Destroyed in 1758 by the English, the works were recommenced in 1764 and completed before the Revolution.

Meanwhile, in 1783, a start was made in the construction of the principal marine work at this port, the great breakwater, 3,750 metres (nearly 2½ miles) long, which shelters the roadstead. This work, whose execution called for exceptional energy and perseverance, was not completed until 1853.

At that time, not only was the commercial port improved by the extension of the jetties of the outer basin and the enlargement of the wet dock, but the military port also, excavated in the rock by order of Napoleon I., and comprising three tidal basins, was nearly finished. In 1858, Napoleon III. opened the third of these basins, which is named after him.

The enclosure of the roadstead was completed, about 1890, by the construction of the breakwaters of Querqueville, on the West, and of Tourlaville, on the East. The formation of a smaller roadstead, more fully sheltered, was at last begun by the construction, between 1910 and 1913, of the Homet Jetty, commencing at the N.E. angle of the military harbour works.

The construction, after the War of 1914-18, of a deep-water commercial harbour at Cherbourg, was undertaken in consequence of the appearance and development in these waters of transatlantic traffic.

It was in 1869 that a liner first called at Cherbourg Roads. By 1900, the annual calls had risen to 300, with 18,000 passengers, and by 1913 to 550 calls, with 68,000 passengers. Suspended during the War, the transatlantic traffic began again in 1920, and rapidly increased. In 1926, seventy vessels of eleven different lines made a total of 816 calls. The maximum was reached in 1930, when the calls numbered 948.

A first instalment of extension works, begun in 1923, was completed in 1927. This comprised:—

(1) The construction, to the East of the East Jetty of the Outer Basin, of a mole with 600 metres of effective quayage, being the first mole of the new Mielles Harbour, and the arrangement on the Eastern side of this mole, of berthage dredged to five metres below zero, for the accommodation of tenders.

(2) The formation of a jetty called the Flemings' Jetty, protecting the Eastern part of the inner roadstead (Mielles Bay) and leaving a passage 500 metres wide between its round-head and that of the Homet Jetty.

A second instalment, put in hand in 1928, comprised:—

(1) The replacement of the berthage for tenders only, provided on the East side of the first mole, by deep-water berths for liners.

(2) The erection on the first mole of a modern marine station, fully equipped and having direct rail connection with the main line from Cherbourg to Paris.

(3) The construction of a second mole, with deep-water quay on its Western side.

(4) Dredging, in the inner roads and in a small part of the outer roads, of turning areas for manœuvring the steamers; also dredging the basin lying between the two moles.

This programme is practically accomplished. The completion of the Northern half of the second mole, however, which is not absolutely necessary at present, has been deferred. There only remains to be carried out the excavation in rock of a bed 50 metres wide alongside the East quay of the first mole, to improve the depth at this quay. This work may be undertaken at any time now.



*Marine Station, Footbridge and Stairways in reinforced concrete.*

## Port of Cherbourg—continued

### II—Situation and Description of the Port

#### 1. General Features.

Situated on the Northern Coast of the Cotentin peninsula, half way along the English Channel, Cherbourg is in close proximity to the routes followed by the various lines of transatlantic navigation. A railway, 371 kilometres (230 miles) long, connects it with Paris.

Its roadstead, having a total area of 1,500 hectares (3,750 acres), is sheltered by the three outer breakwaters mentioned in the foregoing historical review; the length of it, from West to East, extends to 8 kilometres, or 5 miles.

The two inner jetties—Homet and Flemings—protect an inner roadstead, from which are entered:—

- (i) the military harbour on the West,
- (ii) the old commercial harbour on the South, and
- (iii) the deep-water harbour, or Mielles Harbour, on the South-East.



Marine Station. Embarking and Landing Gallery.

#### 2. The Approaches, the Outer Roads and Liner Moorings therein.

The outer breakwaters leave between their respective extremities two passages called the West and East Passages.

Though the latter, 700 metres wide, can only be used normally by vessels of shallow draft, the former, 1,100 metres wide, offers (on the side nearest to the Western end of the main breakwater) a depth of 12 metres and a channel known to be 11 metres below zero of charts, which is at Cherbourg the low-water level of spring tides.

The outer roads, which in their Western part, have a depth of 12 to 13 metres (39½ to 43 ft.) below low water over an area of 300 hectares (750 acres), offer excellent mooring ground for liners of the largest tonnage. These can enter by the West Passage even during heavy storms, and cast anchor in the deep portion of the roadstead, finding safe shelter and a good bottom. The transhipment of passengers and baggage from these liners by tender can be carried out there under all conditions, the discharge of four or even five liners at one time presenting no difficulty.

Navigation inward or outward is facilitated by a very powerful sound signal and a "radiophare" installed on the Western roundhead of the main breakwater.

The outer roadstead thus provides for vessels of every size, a much appreciated haven of refuge.

#### 3. The Commercial Harbour before the Recent Improvements.

The harbour works which existed prior to the extensions undertaken in 1923 are these:—

- (i) an outer basin and a wet dock for vessels of small and medium tonnage;
- (ii) a deep-water berth for heavy goods at the Homet Jetty;
- (iii) an oil berth at the Querqueville Breakwater.

The outer basin and its approach channel have a depth of 3 metres (10 ft.) below zero. The West Quay of this outer basin is reserved for fishing vessels—trawlers and sailing or motor smacks. The East wharf, which formerly served for tenders carrying passengers, baggage and the transatlantic

mail, is now used by small craft and for the Cherbourg-Southampton cross-channel traffic.

The wet dock, 406 metres long by 127 metres wide (1,320 ft. by 417 ft.) is employed in the general cargo and coal trade. Its entrance lock has an effective width of 15.4 metres, or 50½ ft.

The Homet Jetty, 20 metres (65 ft.) wide, adapted for commerce for the Eastern 500 metres (1,640 ft.) of its length, is able, by means of rafts or dummies, to accommodate vessels drawing 8 metres (26 ft.) at all states of the tide. It is especially devoted to the coal trade. A stock dump, situated between the Marine Arsenal and Equeurdreville, completes the accommodation.

The oil berth, formed by two small stone projections from the Querqueville Jetty and by mooring rafts, can accommodate tankers of 11-metre (36-ft.) draft. A pipe-line connects this with a group of tanks at Hainneville, which are themselves connected by another pipe-line with a can-filling depot adjoining the station at the Equeurdreville stock-dump.

#### 4. Extensions since 1923.

The works of extension undertaken have had in view the creation of the first dock and of a part of the deep-water basin, known as the Mielles Harbour.

The general lay-out of this harbour comprises three docks, 600 metres (1,970 ft.) in length, and varying from 230 to 160 metres (755 to 525 ft.) in width, opening in a direction nearly due North. These docks and the reclamation around them will cover the whole of the South-Eastern portion of the inner roadstead.

##### A. THE FIRST DOCK AND ITS APPROACHES.

The first dock, designed especially to provide for transatlantic traffic, enables ships to effect alongside the quay the operations which had formerly to be carried out in the open roads by the employment of tenders.

It lies between Mole No. 1, on the West, wholly occupied by the new marine station, and Mole No. 2, on the East, whose equipment in the way of railway tracks and of machinery is now under consideration.

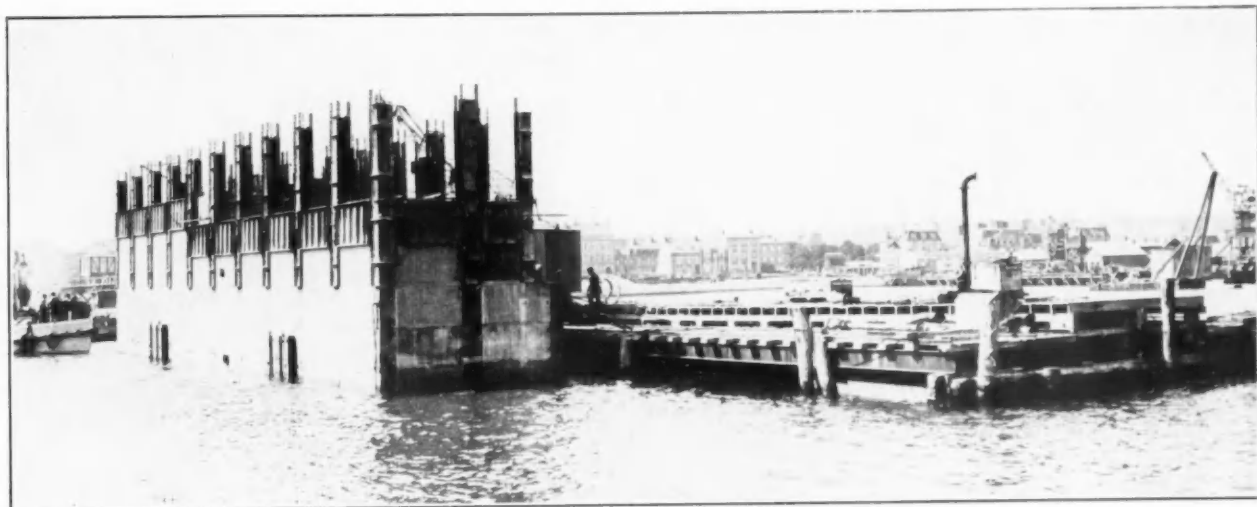


Fice-ton Crane at the Quay of France.

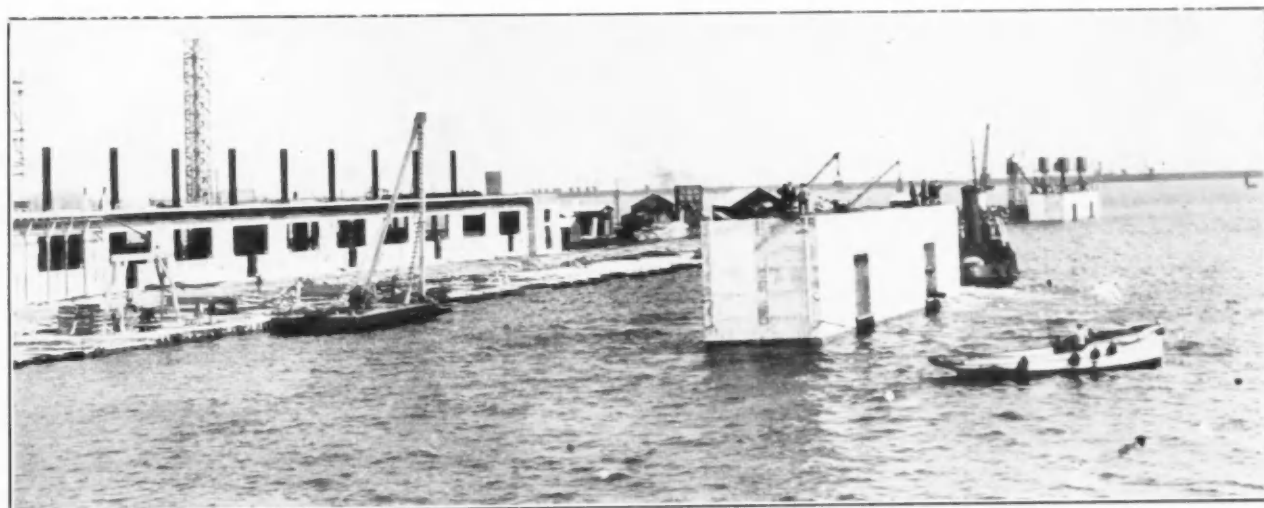
This dock, of rectangular form, covers 14 hectares, or 35 acres; it is 230 metres (755 ft.) wide, 620 metres (2,035 ft.) long, and the length of deep-water quays is 920 metres (3,020 ft.) ready for immediate service, capable of rapid extension in case of need first to 1,210 metres (4,070 ft.) and then to 1,480 metres (4,850 ft.). The depths of water actually available are 11 metres (36 ft.) below low water in the Northern and 10 metres (nearly 23 ft.) in the Southern half. The bed, 50 metres (164 ft.) wide, alongside the quay of the first mole, is to be deepened to 13 metres (43 ft.) below low water at the Northern berth (350 metres) and to 12 metres (39½ ft.) at the Southern berth of this quay. These depths will enable the largest vessels in the transatlantic service to lie at this quay under any conditions.



## Port of Cherbourg



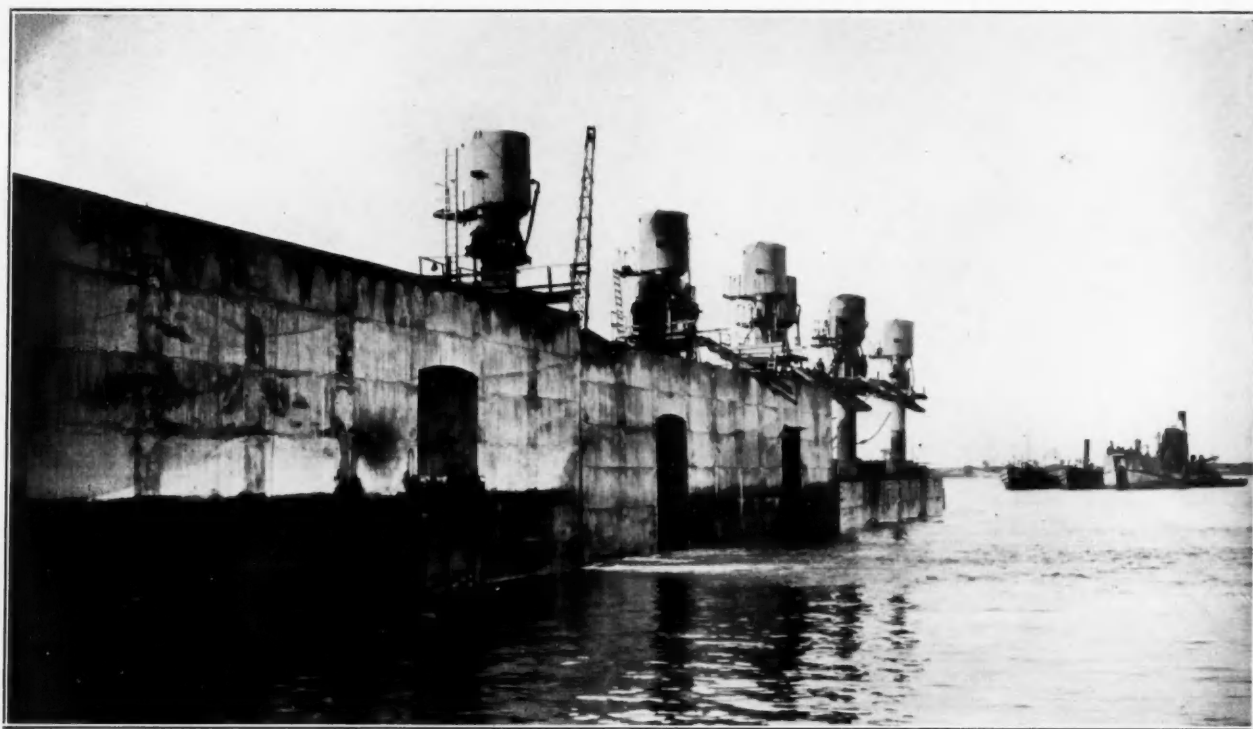
*Construction of a Reinforced Concrete Caisson.*



*Towing a Caisson into place.*



*East Quay of the Dock.*

*Port of Cherbourg—continued**Sinking Caisson under Compressed Air.*

The depth alongside the completed portion of the quay on the second mole, which is 10 metres (nearly 33 ft.) below zero, can likewise be increased by excavation if necessity should arise.

Communication between this dock and the deep water of the outer roadstead is rendered possible by means of a passage 500 metres wide, dredged to 11 metres below zero, between the heads of the Homet and the Flemings' Jetty, and of a turning area dredged to a like depth of 11 metres, which occupies the whole central portion of the inner roadstead and enables large vessels to manœuvre with the greatest ease. This deep-water zone can eventually be extended westward and eastward throughout the whole useful area by dredging in convenient stages.

The West quay of the dock (the Quay of France), along which the Marine Station is built, measures 620 metres (2,035 ft.), but the East quay of the same dock is only completed and usable for 300 metres (370 ft.) at its Southern end.

**B. THE QUAYS.**

These quays, intended generally for the same traffic—passengers, baggage and mails—and excluding the deposit of heavy goods imposing a load of more than 3 tons per square metre (5 cwt. per ft.), are constructed on the same model. The quay walls rest on a very sound foundation, consisting of schistous rock, foliated and soft at the surface, but becoming hard and often very hard at a depth of one or two metres. For the two quays already built, the surface of this rock was found at depths varying from 11 to 14 metres below zero; but depths of 20 to 22 metres were found at the North Knuckle of the Quay of France. Such depths have necessitated at this point a special form of construction with counterweight in the rear.

Each quay is built with a vertical concrete wall of constant thickness from the rock foundation up to high-water level. This thickness is 6.2 metres (20 ft. 4 ins.) for the West and East quays, but will be reduced to 5.2 metres (17 ft.) for the proposed South Quay. These quay walls, embedded in the sound virgin rock for a height of at least 50 cm. (20 ins.), are subject to earth pressure on their lower part only, from the rock surface up to —5 m. for the West quay and —4 m. for the East quay. Above these levels the walls are immersed in the sea on both inner and outer faces, without earth pressure, and the slopes of the filling are retained by revetments of rubble pitching. The void thus left behind each wall, in which the tide ebbs and flows freely by way of holes formed below low-water level, is covered over by a decking of reinforced concrete carried on rows of piles driven to the rock.

These quay walls were built in the form of reinforced concrete caissons, 33 metres long by 6.2 metres wide (108 ft. by 20 ft. 4 ins.), having a height of 16 metres (52½ ft.) for the West quay, increased to 20 metres (65½ ft.) for the East quay, so as to keep their tops above H.W.O.S.T. The caissons were sunk, under compressed air, into the rock until the required depth was reached. Those for the West quay were

thus sunk through sand overlying the rock, but in the case of the East quay the sand was first removed by dredging, thus reducing the depth to be sunk under compressed air to 2 or 3 metres at most.

For the East quay, the extra height of the caissons enabled all masonry and concrete work to be executed without interference by the tide, except for the facing with artificial stone above the level of +2 m. For the West quay, however, the execution of the wall above +2 m. and even the concrete filling of the caisson compartments had to be done by tide work, which occasioned much inconvenience and additional expense. The adoption of the caissons of 20-metre height was therefore of great advantage.

These quays are provided with floating fenders, made of brushwood, in cylindrical form, 1.4 metres in diameter by 3.5 metres in length (4½ ft. by 11½ ft.), kept in place by two wire ropes fastened at one end to the wooden core of the fender and at the other end to rings built in the quay face at half-tide level. These fenders are placed at 100 ft. intervals.

**C. THE NEW MARINE STATION.**

Erected on the central portion of No. 1 Mole, the Marine Station forms a group of buildings of an aggregate extent of 2½ hectares, or 6 acres, while its railway tracks occupy nearly the whole area of the mole.

The station proper is made up of three contiguous parts:—

- (1) The main building, of two storeys and with towers;
- (2) The covered carriage-way;
- (3) The platforms and tracks.

(1) The main building, 280 metres long by 42 metres wide (920 ft. by 140 ft.), includes:—

(a) At first-floor level, on the East front, facing the ships' berths, an embarking and landing gallery which extends for the whole length and beyond it by means of two narrow wings, each 110 metres long, to North and South, making a total length of 500 metres, or 1,640 ft.

This length of gallery was necessary, on account of the central position of the station on the mole, to allow two large liners to be dealt with at one time.

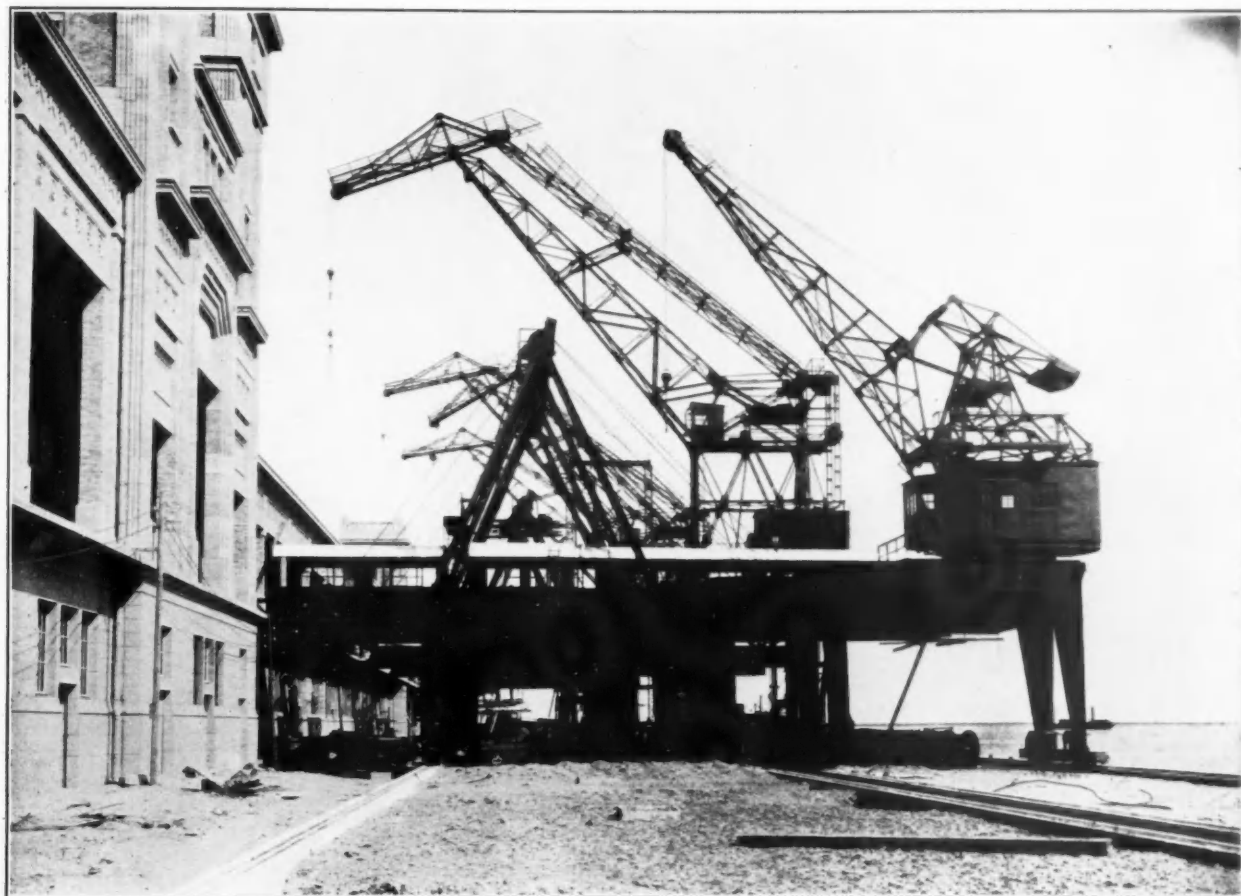
(b) On the first floor, between the landing gallery and the covered carriage-way, are the various offices and other accommodation appertaining to the station, arranged symmetrically about the East-to-West axis of the building: the customs examination rooms, a central hall for cabin passengers, the circulating area, special waiting rooms for emigrants, offices of shipping companies, restaurant, post office, money-changing office, shops, etc.

(c) On the ground-floor level, a shed for the overhaul of the boat-trains, affording standage on five tracks, 280 metres (920 ft.) long, and provided with every facility for the maintenance of this rolling stock in good repair.

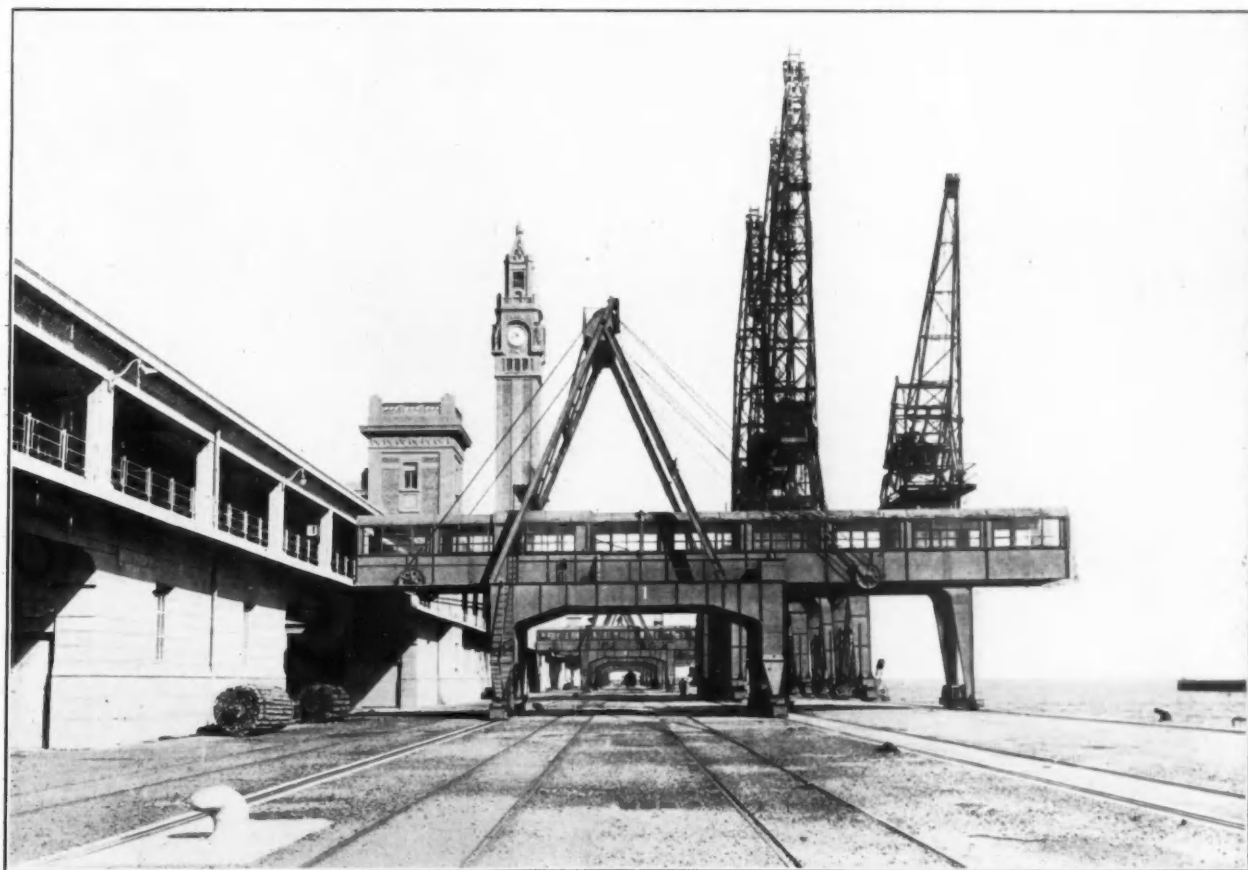
That part of the shed which lies nearest to the quay can be used, if required, for the storage of goods.

(2) The covered way under whose roof runs the main road from Paris to Cherbourg, measures 240 metres by 15 metres

## *Port of Cherbourg*



*Equipment of the Quay of France, under erection.*



*Equipment of the Quay of France: Landing Gangway (in horizontal position) and Cranes.*

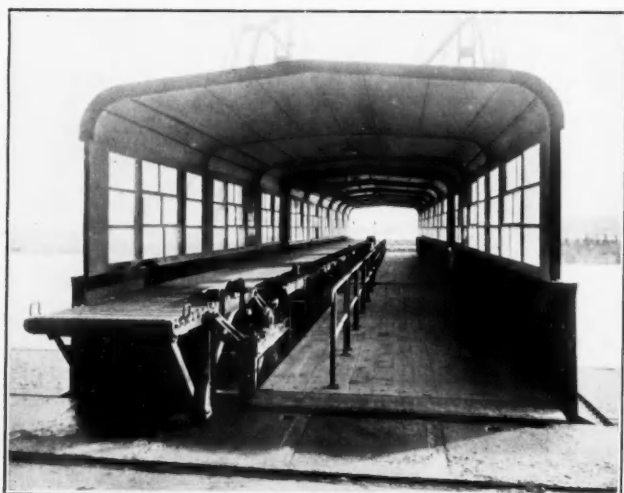


### Port of Cherbourg—continued

(790 ft. by 50 ft.). The paved area under cover is provided, in addition to its side footways, with three lengths of central footway, on which are placed the stairways giving access to the upper storey.

(3) The roof over the tracks and platforms measures 240 metres by 40 metres (790 ft. by 130 ft.). It covers four lines of railway, grouped in pairs between three passenger platforms, the central one 9 metres wide and the two on either side 7 metres each.

Communication between the upper storey of the main building and the arrival and departure platforms is effected by means of three footbridges of reinforced concrete, at the level of the first floor, one at the centre and the other two near the North and South ends. These footbridges, 7 metres wide, are connected with the roadway and with each of the platforms by means of staircases. One of these staircases at each platform is replaced by a baggage lift, for each of the two end footbridges, which are in line with the customs examination rooms in the main building.



Interior of a Landing Gangway, with Footway and Endless Band Conveyor.

The entire structure is built as a framework of reinforced concrete, borne upon 923 piles, of an average length of 19 metres (62 ft.), driven to rock. The walls are built in block-work of reconstructed granite, treated by sand-blast, and of Montereau bricks. Dominating the whole is a graceful tower 67 metres (220 ft.) high.

#### D. EQUIPMENT OF THE QUAY OF FRANCE.

The mechanical equipment of the Quay of France has been designed and constructed with a view to the quick "turn-round" of vessels. It comprises:—

(1) Travelling gangways for communication between the vessel and the station;

(2) Cranes of long outreach, specially adapted to serve the large liners.

The necessary current for these machines is 3-phase current at 380 volts between phases, supplied from a transforming station of 1,160 K.V.A. capacity, located in one of the compartments on the ground floor of the Marine Station. Each crane is fitted with a flexible cable, wound automatically on a drum, for coupling up to one of the power plugs placed at 15-metre intervals along the quay.

The travelling gangways and the cranes operate on the quay lying between the East front of the station and the cope-line, this quay having a width of 31 metres, or 102 ft., with a crane-track of 9-metre gauge and a second track of 11.4-metre gauge for the travelling gantries, the former being 600 metres and the latter track 520 metres long.

#### Travelling Gangways.

These serve to connect the landing gallery of the station, to every point of which passengers have access, with the decks of ships, while giving the requisite clear opening for three tracks on the quay. These steel-framed gangways, nine in number, are formed with a pedestal carried by four two-wheeled bogies, running on the track already mentioned. The pedestal supports a gangway, roofed over and having glazed sides, 3.8 metres (12 ft. 6 in.) wide; the station end, for a length of 10 metres, being fixed and the outer end, 21 metres in length, being adjustable.

This adjustable outer portion, hung on steel wire ropes, swings on a horizontal axis above the pedestal, in such a way that the end connecting with the ship can be set at any desired

height above quay level, to suit the height of the deck to be reached and continue so at any state of the tide. This hinged portion of the gangway can even be raised vertically against the tower over the pedestal, so as to clear the way completely for the portable cranes to travel along their quayside track.

Special contrivances ensure the continuity of the roof and floor of the gangway, whatever position may be taken by its adjustable parts. The gangway is divided in two parts longitudinally by a movable hand-rail, one side forming a footway for passengers and the other, by means of an endless-band conveyor, serving for the transport of baggage. This conveyor, 1 metre wide, travels at 50 cm. per second, or 100 ft. per minute.

Each gangway weighs 100 tons, and its various motions are effected by six motors, two of which operate the baggage conveyor.

#### Cranes.

The lifting machinery provided on the quay comprises:—

- 1 crane of 10-15-ton capacity,
- 4 cranes of 5-ton capacity,
- 2 cranes of 3-ton capacity.

All these cranes have travelling portal pedestals, luffing jibs and level-luffing gear.

The five first named are specially built for the service of the large liners; the two last, much smaller and of shorter outreach, and placed one at each end of the quay, are intended for handling baggage and mail bags transhipped by tenders to and from ships moored in the outer roads.

### III—Traffic

#### A. Goods.

The Port of Cherbourg, by reason of its position at the extremity of a peninsula and of the absence of any river leading to it, has until now had a goods trade of very limited volume, restricted almost entirely to the needs of the town of Cherbourg itself and of the neighbouring region.

The table below summarises the traffic of the past ten years:

Years	GOODS. Tons		
	Inward	Outward	Total
1925	211,460	70,303	281,763
1926	192,862	88,793	281,655
1927	256,527	73,505	330,032
1928	189,007	77,775	266,782
1929	241,772	38,575	280,347
1930	269,801	37,436	307,237
1931	245,923	48,172	294,095
1932	230,314	42,667	272,981
1933	234,439	36,855	271,294
1934	176,895	32,594	209,489

The imports are mainly coal, also petrol, cement, Baltic timber and grain. The exports, which amount to no more than 15 to 20 per cent. of the total, consist mainly of broken stone for road-making.

#### B. Passengers and Mails.

The transport of Transatlantic passengers, with their baggage, and of mail-bags, constitutes the main factor in the traffic of the port and its principal source of revenue.

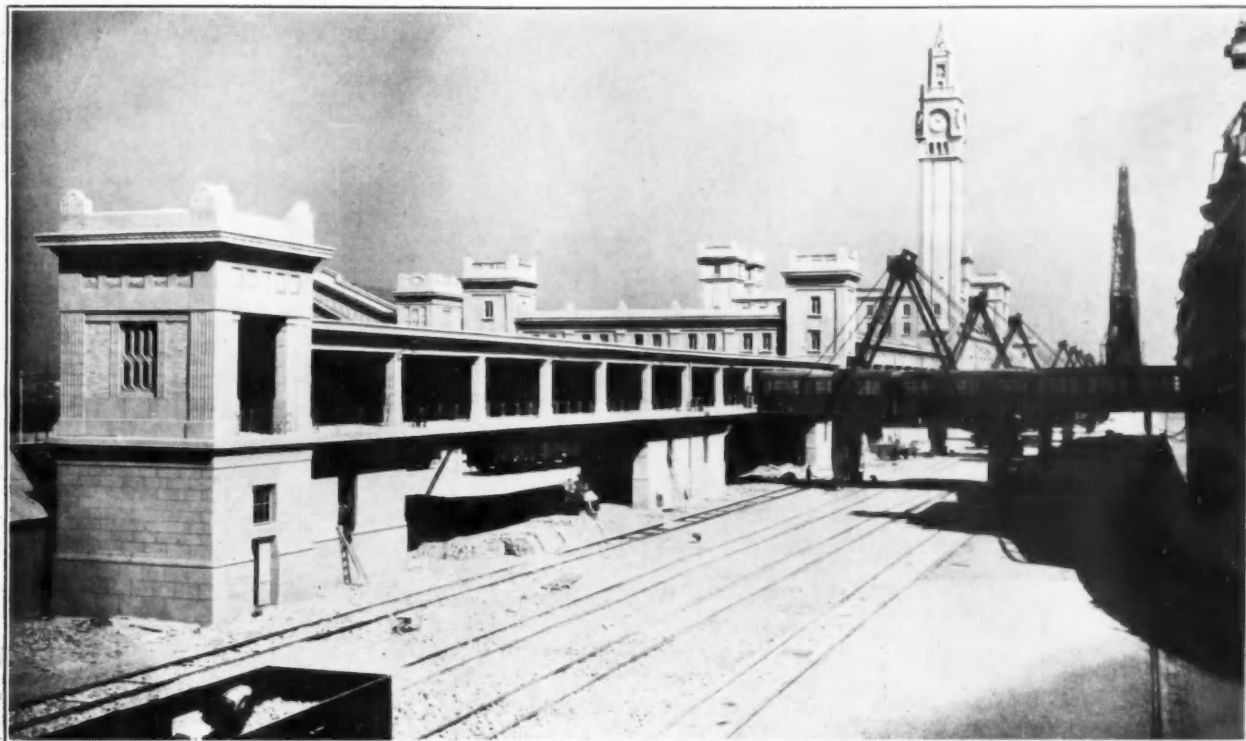
The movement of passengers during the past ten years has been as shown hereunder:—

Years	To or from America	PASSENGERS		Total
		To or from European Ports	Excursionists	
1925	165,003	8,467	11,192	184,662
1926	179,849	9,615	11,500	200,964
1927	188,188	8,876	14,058	211,122
1928	176,074	10,761	16,556	203,391
1929	181,065	9,448	13,479	203,992
1930	165,046	9,602	9,357	184,005
1931	114,288	7,329	11,029	132,716
1932	79,125	3,817	10,646	93,588
1933	49,801	3,296	12,872	65,969
1934	38,716	3,331	12,804	54,851

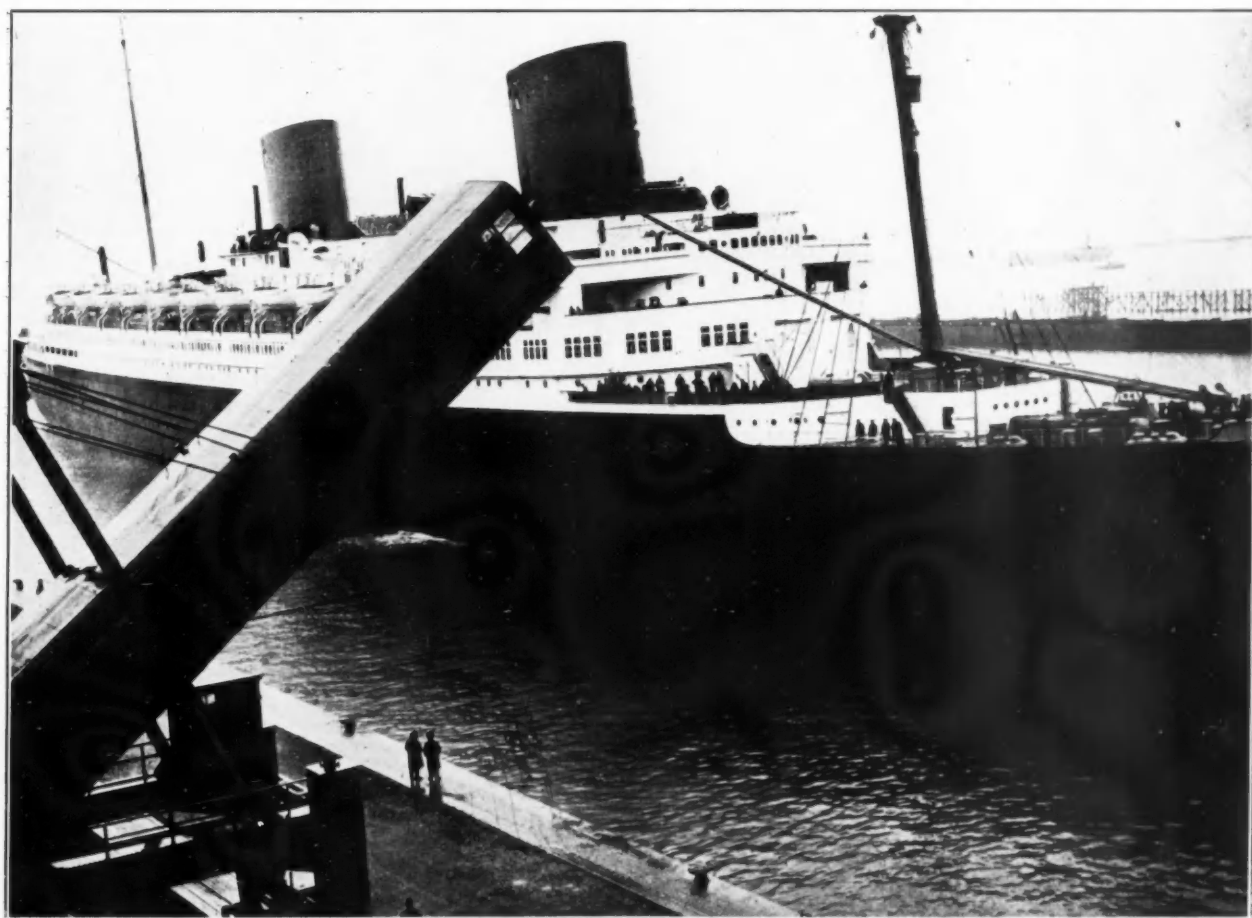
The numbers of mail-bags passing annually through the Port of Cherbourg—including those carried by air mail since 1930—are given in the table below:—

Years	Inward	Outward	Total
1925	251,542	222,183	473,725
1926	258,182	259,774	517,956
1927	262,961	264,695	527,656
1928	270,656	262,726	533,382
1929	251,427	273,045	524,472
1930	262,819	267,439	530,318
1931	255,166	270,007	524,173
1932	188,224	253,593	441,817
1933	118,669	242,798	361,467
1934	95,746	193,776	289,522

## *Port of Cherbourg*



*South End of the Quay of France, with the Southern Arm of the Embarking and Loading Gallery and a Travelling Gangway in use.*



*Liner coming alongside the Quay of France.*

*Port of Cherbourg—continued***C. Shipping.**

The movement of shipping of all classes, and that of Transatlantic liners, in the Port of Cherbourg during the past ten years is given by the two tables below:—

**I.—SHIPPING OF ALL CLASSES.**

Years	Inward		Outward		Total	
	No.	N.R.T.	No.	N.R.T.	No.	N.R.T.
1925	1,614	11,033,309	1,615	11,033,519	3,229	22,066,828
1926	1,659	10,706,317	1,662	10,702,194	3,321	21,408,511
1927	1,562	10,818,230	1,559	10,823,303	3,121	21,641,533
1928	1,583	11,520,590	1,586	11,517,261	3,169	23,037,851
1929	1,523	11,456,669	1,516	11,445,970	3,039	22,902,639
1930	1,597	12,727,244	1,602	12,735,914	3,199	25,463,158
1931	1,297	11,001,564	1,297	11,001,564	2,594	22,003,128
1932	1,112	8,383,245	1,112	8,383,245	2,224	16,766,490
1933	1,047	7,868,017	1,047	7,868,017	2,094	15,736,034
1934	907	6,730,552	907	6,730,552	1,814	13,461,104

**II.—TRANSATLANTIC TRAFFIC.**

Years	No. of Ships		Registered Tonnage	
	In or Out	Total	In or Out	Total
1925	876	1,752	10,758,503	21,517,006
1926	816	1,632	10,247,525	20,495,050
1927	836	1,672	10,519,104	21,038,208
1928	898	1,796	11,272,637	22,545,274
1929	881	1,762	11,204,879	22,409,758
1930	948	1,896	12,443,151	24,886,302
1931	750	1,500	10,797,327	21,594,654
1932	536	1,072	8,166,394	16,332,788
1933	469	938	7,622,594	15,245,188
1934	408	816	6,575,987	13,151,974

An examination of the figures in these tables of the traffic of the Port of Cherbourg shows that this port has suffered more

than many others have done from the effects of the present economic depression. The falling-off in Transatlantic navigation, the reduction in the number of passengers and especially of first-class passengers, has been a severe loss to this traffic, and consequently to the port revenues.

It is none the less true that the works of extension recently completed and those about to be completed by the excavation, alongside the Marine Station Quay, of a deeper bed, enabling liners to remain at their berths at all states of the tide, have endowed the port with facilities for the accommodation of such liners, easy of access, equipped with the most up-to-date machinery and capable of rendering the fullest possible service. These improvements, which were planned during the period of intensive port activity (1925 to 1930), are sufficient to ensure, with a maximum of speed and under the best conditions, a quayside service second to none for liners in numbers such as called at the port in its most prosperous years. The faster running of trains between Cherbourg and Paris, introduced at the same time by the State Railways, enables these trains to make the journey in less than 4½ hours, and trials are now in progress with a view to even greater increase in speed.

In conclusion, it may be remarked that the very extensive areas of land recently reclaimed, by the deposit of material dredged from the Transatlantic Dock and its approaches to the North of the former shore-line, between the root of the second mole and the Flemings' Fort, are available as sites for industrial establishments. Factories which may be installed there will benefit, for the importation of their raw materials and the exportation of their products, from their proximity to deep-water quayage, especially the West quay of the Dock.

*Aden Port Trust*

The returns of shipping using the Port of Aden for the month of March, 1935, are as follows:—

	No.	Tonnage
Merchant Vessels over 200 tons	148	664,520
"    under 200 tons	4	643
Government Vessels	8	19,349
Dhows	123	3,657
PERIM.		
Merchant Vessels over 200 tons	17	51,526

The total value of imports, excluding Government Stores, was Rs. 48,00,000/-, as compared with Rs. 43,08,000/- for March, 1934, and of exports Rs. 29,53,000/-, as compared with Rs. 35,56,000/-.

The total value of both imports and exports together was Rs. 77,53,000/-, as compared with Rs. 78,64,000/- for the corresponding month last year.

Imports during the month were above those for March, 1934, in the case of gums and resins, hardware, raw hides, sugar, white, printed or dyed piece-goods, twist and yarn, unmanu-

**TRADE OF THE PORT.**

Article.	Unit	Imports		Exports	
		Quantity.	Value Rs.	Quantity.	Value Rs.
Coal	Tons	2,679	37,510	0	0
Coffee	Cwts.	4,436	1,15,422	7,464	2,75,774
Grain, Pulse and Flour	"	42,890	2,18,098	29,156	1,30,796
Gums and Resins	"	7,863	1,05,465	3,601	82,872
Hardware	"	0	32,285	0	35,816
Hides, raw	No.	4,012	11,645	8,451	10,398
Oil, Fuel	Tons	59,383	14,00,738	0	0
" Kerosene	Gls.	20,450	13,546	7,012	3,494
" Petrol	"	17,683	16,200	0	0
Salt	Tons	0	0	19,950	2,06,600
Seeds	Cwts.	2,059	18,465	489	5,462
Skins, raw	No.	359,886	1,76,875	259,427	3,27,549
Sugar	Cwts.	43,424	1,83,131	26,741	1,12,606
Textiles—					
Piece Goods, Grey	Yds.	2,292,180	3,01,240	2,506,900	3,19,999
"    White	"	708,946	1,10,588	197,085	28,241
"    Printed or Dyed	"	1,529,205	2,49,249	1,370,410	2,99,990
Twist and Yarn	Lbs.	229,660	96,330	125,782	52,629
Tobacco, Unmanufactured	"	1,335,824	2,70,969	274,435	58,465
"    Manufactured	"	94,518	62,474	39,577	22,234
Other Articles	No. of Pkges.	41,006	10,29,665	21,568	4,46,310
Treasure, Private	"	0	3,50,388	0	5,33,633
Total	—	—	48,00,283	—	29,52,868

The number of merchant vessels over 200 tons that used the Port in March, 1935, was 148, as compared with 143 in the corresponding month last year, and the total tonnage was 665,000, as compared with 635,000.

Excluding coal, salt, fuel oil and Military and Naval Stores and transhipment cargo, the total tonnage of imports in the month was 9,200, and of exports 5,800, as compared with 11,400 and 7,600 respectively for the corresponding month last year.

factured and manufactured tobacco, and private treasure; and below, in the case of coffee, grain, pulse and flour, seeds, raw skins and grey piece-goods.

Exports were above those for March, 1934, in the case of hardware, raw hides, sugar, printed or dyed piece-goods, manufactured tobacco, and private treasure; and below, in the case of coffee, grain, pulse and flour, gums and resins, seeds, raw skins, grey and white piece-goods, twist and yarn, and unmanufactured tobacco.



## Irish Harbour Matters

### Galway Harbour Bill—Preamble Proved.

THE Joint Committee composed of members of the Dail and Senate (the lower and upper Houses of the Free State Parliament) sat, on 16th May, to consider the Galway Harbour Bill, in Leinster House, Dublin. Deputy J. M. Dillon (chairman) presided, and the other members present were:—Deputies Alderman Corish, John Good, Seamus Moore; and Senators J. C. Dowdall, P. Wilson and M. Staines.

Mr. Gavan Duffy, K.C., and Mr. T. J. Connolly (instructed by Messrs. Blake and Kenny, solicitors) appeared for the promoters, the Galway Harbour Commissioners and the Galway Urban Council. Mr. L. O'Dea, solicitor, appeared for the Galway Co. Council. Messrs. Carton, O'Meara and Kieron, the Parliamentary Agents for the promoters, also were represented.

Outlining the purpose of the Bill, Mr. Gavan Duffy said that the promoters had in view the provision of an up-to-date port for large and small trading vessels, with the essential modern equipment for handling cargo rapidly, and the provision of a safe and easily negotiable approach channel. They also sought to establish adequate facilities for the transatlantic liner traffic in Galway Bay, and lastly to develop their local fisheries. At present the docks and the approach channel were inadequate. There was a natural barrier of rock outside the docks, and a small vessel could cross only to find an antiquated dock that had been built for the needs of a century ago. Some 1,400 yards out from the docks, a boat left the natural channel 13 ft. deep in the bay to enter the narrows of the harbour, where, in places, the water was only 2 ft. deep.

It was a matter of extreme annoyance that a tender which went out to meet transatlantic liners had to wait for four or five hours before she could take out her passengers, while she had been delayed five or six hours while bringing her passengers into the town, although she drew only 9 ft.

Mr. Thos. McDonagh, chairman, Galway Harbour Commissioners, said that the Dun Angus Dock was available only for that vessel and some fishing boats. The Commercial Dock was the only one available for general shipping, and at neap tides it was impossible for a vessel to come in there. At high tide, vessels up to 16 ft. draught could enter. A vessel only 12 ft. 8 ins. had been lying in the roadstead for a week. Great inconvenience had been caused because the Dun Angus and the tenders were at the mercy of the tides. After the improvement, vessels of between 5,000 and 6,000 tons could come in, and that would mean a considerable reduction of freights.

Replying to the Chairman, Mr. McDonagh said that the Commissioners themselves had not considered projects for the linking up of Galway with the European air lines.

Mr. T. J. W. Kenny, President, Galway Chamber of Commerce, President of the Irish Tourist Association, and a member of the Galway Harbour Commissioners, said that in 1927 three liners called at the port, and 291 passengers had been dealt with. There had been an increasing number of calls year by year until 1933, when 101 liners called and 9,464 passengers were dealt with, and in 1934, 91 calls and 8,111 passengers dealt with. In five years over £5,000 had been secured in revenue from liners. The possibilities of developing air connections with Galway had not been overlooked.

On the following day, Sir Cyril Kirkpatrick, engineer for the promoters, was examined by Mr. M. J. Connolly as to the details of the scheme.

He explained that when the first stage was completed, passengers for the Arran Islands would be able to embark at all times, and fishing vessels drawing about 15 ft. could be close alongside the pier at all times during full tides. Tenders for transatlantic lines could take out or bring in passengers at all times.

In the second stage, the Commercial Dock would be deepened and the quay would be widened. There would then be available, in addition to the approved channel, a combined dock, having a water area of  $7\frac{1}{2}$  acres. Of these, five acres would be deepened to the same depth as the approach channel for vessels drawing up to 21 ft. 9 ins. It would be possible for larger vessels to enter at certain tides. Vessels, 375 ft. in length, could turn in the approach channel, but not in the dock.

Sir John Purser Griffith, examined by Mr. Gavan Duffy, K.C., stated that he agreed entirely with the evidence of the previous witness. If the money could be found, he would approve of the proposal to extend operations to the second stage. He was strongly in favour of the channel being 300 ft. wide. He would not approve of a width of 260 ft.

The Joint Committee made the following order:—

"We find the preamble proved inasmuch as we are satisfied that the proposals for the improvement of Galway Harbour are

adequate, and that the capacity of the Corporation referred to in the preamble, supported by its guarantors to raise the required money is undoubtable."

The Committee then adjourned for a week, when the sections of the Bill will be examined.

### No Deep Water Port for Donegal.

The County Donegal Transport Committee, consisting of Mr. Joseph Ingram, chairman, Mr. Philip O'Donoghue, Mr. Arthur Hassard, and Mr. P. J. Hayden, as secretary, has now issued its report.

The terms of reference requested the Committee to report on the desirability of establishing a county port capable of accommodating large overseas vessels, the desirability of curtailing or extending existing railway and road transport changes in present statute law, etc.

In their report the Committee review at length the position of transport in Donegal. Before the Free State was established and the Customs barriers erected the county's rail-borne trade was centred in Londonderry and Belfast. Since then many Londonderry merchants have established depots within the county to supply their Donegal customers. They were to a larger extent than previously supplying goods manufactured in the Free State. Previous to the border being established, transport facilities in the county were, on the whole, satisfactory.

The tariff policy has naturally had the effect of compelling the Donegal traders to obtain most of their supplies from Saorstad sources, and as these are, generally speaking, at considerable distances from Donegal, the freights are higher than when goods were obtained from Belfast or Londonderry, and the time occupied in transit has been increased.

The Committee state:—"We are of opinion that no case has been made for either construction of an entirely new harbour or the extension of one of the existing harbours." The trade of Donegal would not warrant such a scheme, nor did the Committee believe that a Donegal port would be utilised to serve the needs of other counties. If the establishment of a port capable of accommodating large overseas vessels were considered desirable they were of opinion that the proper location would be Lough Swilly, where deep water shelter is available. Even as it is, Lough Swilly seems to offer every facility for a "large port." This idea did not receive any support from witnesses.

On the subject of regular shipping services the Committee state:—

"The evidence on behalf of the Limerick Steamship Company was particularly important and interesting. The witness, who was the manager of the Company, had personally made a fortnight's tour of Donegal and investigated thoroughly its traffic potentialities. An illuminating instance was quoted by him. His Company had a steamer 'ex-Liverpool,' which it was proposed should call at some of the Donegal ports if traffic offered. The traders in Donegal were canvassed for orders, but not one consignment was forthcoming. The difficulties of establishing a regular steamship service are increased by the rather unreasonable demands of the traders, who stress its importance to them. For example, an egg merchant in Letterkenny claimed that his business would require in the season a service from that port three times weekly to Glasgow and once to Liverpool. When it is remembered that such ports as Limerick, Sligo and Galway have nothing like this suggested service the difficulty of meeting this demand will be appreciated."

The system of chartered vessels has been evolved by merchants of County Donegal to suit the conditions of the county. So far the system has been worked by individual merchants, each on his own account. We see no difficulty in a considerable extension of the system if the merchants at any centre (or at adjacent harbours) would combine to charter a vessel and bring in a mixed cargo by this means.

The Committee make certain recommendations with regard to Letterkenny, which seemed to them to be the natural distributing centre for a large part of Donegal, and they express surprise that the traders, with one exception, have not taken advantage of its situation since the border tariffs had altered the flow of trade. These recommendations include a survey of the existing port of Ballyraine, of the suggested site at Thorn, and any other site that might appear to present superior facilities. The cost would be large, but the Committee regard such improvements as the most desirable marine works suggested in their report.

In the course of their comments on Moville, the Committee observe:—"There is no Saorstad port or harbour authority responsible for the administration of this or any other port on the Foyle. It would appear that under, and by virtue of, a series of private statutes of the Parliament of the late United

### *Irish Harbour Matters—continued*

Kingdom, the Londonderry Port and Harbour Commissioners have been exercising control over (inter alia) the slips and piers on the Saorstát shore of the lough. We consider it necessary and desirable that the control and maintenance of the ports and waterways in the State should be carried out by Saorstát authorities, and that, therefore, any requisite diplomatic or legislative action to secure this end should be instituted."

No fewer than sixteen proposals for railway extensions were put to the Committee, none of which were recommended. The Committee did not consider they were necessary.

With regard to road improvements the Committee set out a series of roads which should be reconstructed and widened at an estimated cost of £75,000.

#### *Death of Mr. Wm. A. Hewat.*

Mr. Wm. A. Hewat, who died at his residence, Ardlui, Blackrock, Co. Dublin, on 16th May, was one of the best-known business men in Dublin. He was a Director of Thomas Hertton and Co., coal importers, for 35 years, a Director of the Dublin United Tramways Co., Ltd., Chairman of the Commercial Insurance Co. of Ireland, a member of the Dublin Chamber of Commerce, a member and Past-Chairman of the Dublin Port and Docks Board, and a member of the Irish Free State Parliament for some years.

At a meeting of the Dublin Port and Docks Board, on 17th May, a sincere vote of condolence was conveyed to Mr. Hewat's relatives. The Chairman (Mr. T. F. Laurie) said that the Board had sustained a tremendous loss in the passing of Mr. Hewat. He was first elected to the Board in 1904 as a representative shipping member, and during the past 31 years had contributed a degree of clarity of thought to the deliberations of the Board, which was invaluable. Relative to insurance matters, they could always rely on his experience and advice. He was, in the main, responsible for the Board's reserve for depreciation and insurance, which now stood at approximately £150,000.

Mr. Hewat was Vice-Chairman in 1911 and Chairman in 1912.

The Lord Mayor of Dublin (Alderman A. Byrne) joining in the expression of sympathy, said that Dublin had lost a good citizen, the needy had lost a good friend, that Board had lost a great adviser, and the country had lost a good Irishman.

Mr. Walter Baird, speaking as "father" of the Board, said that he came on the Board with Mr. Hewat in 1904, and he had never met a finer man. He was Chairman of the Shipping Board in Dublin, and in that capacity he was very helpful.

After transacting urgent business, the meeting was adjourned as a mark of respect.

## *Hull and the East Coast*

#### *Annual Meeting of Humber Conservancy Commissioners.*

At the annual meeting of the Humber Conservancy Commissioners, Mr. J. H. Fisher, J.P., who presided, stated that the ordinary receipts for the year amounted to £35,829, an increase of £174 over the previous year. From shipping dues, alone, the revenue was £23,593, or £37 less than in the previous year. The expenditure amounted to £28,802, or £148 less. The Chairman said that a year ago he had stated that there appeared to be grounds for thinking that the income had started on the up-grade again, but they had failed to realise their hopes, except to a negligible extent. Reviewing the report, Mr. Fisher said it was a matter for gratification to the Board that the works to complete the training walls at Trent Falls were being proceeded with so satisfactorily that they were likely to be finished well within the extended period allowed by Parliament. The Bill deposited in Parliament by the Aire & Calder Navigation applying for an extension of time to the end of 1937, and authorising the Conservancy Board to make the Aire & Calder Navigation an agreed additional contribution of £40,000 over and above the £76,000 already contributed after the completion of the works, had received Royal Assent.

The works undertaken jointly by the Hull Corporation and the London and North-Eastern Railway Company for the improvement of the steam-ferry service between the Victoria Pier at Hull and New Holland, on the Lincolnshire side, had received the approval of the Conservancy Board. There were still in course of settlement a few matters of detail, about which there was not likely to be any difficulty. The Marine Committee, continued the Chairman, had devoted much time and had given very careful consideration to the question of the provision of a new illuminant (acetylene gas) for the Board's light floats and buoys in place of oil gas which had been available to them in the past, but which would soon be unobtainable. It had therefore been decided to adopt another illuminant, necessitating the purchase of new, and the conversion of existing plant, at very considerable cost. The Board, he added, had acquired for their launch, "W. S. Wright," an echo-sounding apparatus, which besides serving its essential purpose, had proved to be a valuable aid in locating wrecks and obstructions on the river bed.

Mr. Fisher, referring to finance, said that the Board of Trade had raised the question of the Foreshore Account which had been rendered by the Conservancy Commissioners and their predecessors since 1868, and had criticised the pooling in a common account of the receipts and expenditure in regard to the foreshore demised by the Board of Trade to the Conservancy Commissioners by the leases of 1869 and 1872, and also in regard to Read's Island. The Board contend that three separate accounts are requisite.

The Chairman added that the Conservancy had conveyed to the Board of Trade an explanation why the pooling system was from the very start adopted and had expressed a wish to co-operate with the Board of Trade in finding a reasonable solution of the question which had arisen, and a hope that their observations might lead to the equitable financial adjustment which both parties desired in regard to profits due to the Board of Trade and not paid over.

The re-election of Mr. Fisher as Chairman was moved by Sir Hickman B. Bacon, one of the original members of the Board, and seconded by Commander W. B. Clementson. Mr. J. Bentley Bennett was re-appointed Deputy-Chairman on the proposition of the Chairman, seconded by Mr. E. P. Hutchinson.

#### *Meeting of Bridlington Harbour Commissioners.*

At the April meeting of the Bridlington (East Yorkshire) Harbour Commissioners, Mr. S. Charlesworth reported upon a conference held between the Commissioners and representatives of the Air Ministry relative to the latter's application for increased accommodation at the harbour. The Commissioners agreed that a further portion of land be let to the Air Ministry on payment of £25 per annum; that they be allowed the use of 100 ft. for berthing, subject to the Air Ministry agreeing to remove their craft when requested to do so by the Harbourmaster, and that they be allowed to erect a crane. These recommendations are subject to the Air Ministry being prepared to recommend a substantial grant towards the purchase of a dredger, a sum of £700 spread over seven years being suggested. The proposed new road on the land side of the harbour has been the subject of further interviews between the Commissioners and the Bridlington Corporation.

Mr. Charlesworth, referring to this, said that material progress had been made and certain misunderstandings cleared up. He also stated that the re-surfacing of the wharf at the west end of the harbour had been almost completed and that work had already been commenced on the boat-landing steps. Owing to the rough weather the work had been delayed, but the new boat-landing stage would be finished by Whitsuntide. Referring to the work done by the dredger since its acquisition a few months ago, approximately 26,000 tons of material had been removed from the harbour. Appreciation was expressed of the work of the Clerk to the Commissioners (Mr. Hankinson) more particularly in relation to income tax matters, and on the proposition of the Chairman (Dr. T. C. Jackson) the Commissioners decided to increase his salary from £100 to £150 per annum, as from January 1st of this year. The Commissioners also decided to proceed at once with the erection of new offices and board room and harbourmaster's house, together with two warehouses with shops underneath. The scheme is subject to Government approval and an arrangement with the Bridlington Corporation. The Commissioners declined to accede to an application to lease a portion of the harbour property for amusement purposes.

The balance sheet of the Bridlington (East Yorkshire) Harbour Commissioners for the year ended March 31st, shows total receipts of £3,557 16s., which included tonnage tolls £919, wharfage and rents £777, fish dues £310, and pier rate £263. The total expenditure on revenue account was £2,393 13s., as against £6,354 in 1934, and the balance carried forward £1,161, as against £1,204. The abnormal outgoing in 1933-34 included £2,728 spent on maintenance and improvements, and £2,000 repayment of loan.

The harbour alteration capital account showed a balance due to the bank £1,200, and the dredger capital account £1,500 on mortgage. It appears that the cost of the second-hand dredger recently acquired was, with re-fitting of boilers, new grabs, etc., £1,760.



## Italian Harbour Affairs

**D**ETAILED statistics regarding shipping at the leading Italian ports for the first quarter of 1935 have just been published. According to figures supplied by the Consorzio Autonomo del Porto di Genova shipping at the leading Italian port during the first three months of 1935 may be summarized as follows:—

	No.	ARRIVALS N.R.T.	Goods Tons	No.	CLEARANCES N.R.T.	Goods Tons
1935 ...	1,393	2,714,436	1,652,638	1,396	2,745,510	231,723
1934 ...	1,321	2,706,222	1,499,286	1,329	2,731,843	239,063
1933 ...	1,268	2,489,352	1,388,081	1,277	2,523,067	250,776
1932 ...	1,149	2,342,754	1,230,754	1,191	2,422,801	214,796

These figures clearly confirm that shipping at Genoa has shown a definite revival, and the slight decrease in exports noticed during the first quarter of 1935 is more than counter-balanced by the large increase in imports. The following figures detail the various goods imported during the period under review:—

	1935			1934		
	January Tons	February Tons	March Tons	January Tons	February Tons	March Tons
Coal ...	260,453	245,543	263,425	218,739	203,175	234,424
Cereals ...	32,256	30,698	41,783	27,201	23,442	41,944
Cotton ...	8,889	7,651	14,961	9,028	10,399	15,088
Wool ...	4,090	3,244	3,809	11,534	4,295	6,179
Skins ...	3,816	3,596	3,869	2,712	2,431	3,702
Phosphates ...	9,356	10,391	5,126	15,206	12,888	11,015
Oil ...	36,884	43,275	62,194	44,024	43,264	57,655
Frozen Meat ...	1,075	1,141	1,349	1,045	732	1,257
Lumber ...	13,948	8,676	12,174	8,509	10,669	24,967
General Cargo ...	156,213	182,338	180,685	144,407	133,998	175,317
	526,980	536,553	589,375	482,405	445,293	571,548

In the first quarter of 1935 there has been a marked increase in the imports of cereals, also coal and general cargo.

Another feature of interest in regard to the situation of shipping in the Port of Genoa is represented by the fact that tonnage dry-docked at the Alle Grazie Docks of the Società Anonima Ente Bacini di Genoa during the first three months of 1935, included 133 vessels, representing 659,342 gross tons, against 117 vessels and 588,903 gross tons during the corresponding period of 1934, 115 vessels and 604,150 gross tons during 1933, and 141 vessels and 687,218 gross tons during the corresponding period of 1932. The construction of the fourth graving dock, measuring 350 metres in length, has already been started in the same zone where the existing three docks are situated.

The new Port of Leghorn has just been completed, and it is expected that the warehouses, etc., will be completed by 1937. However, in order to avoid congestion in the old port, the Harbour Authorities have now arranged for the use of the quays in the new port, especially for ships carrying goods in bulk.

The Azienda dei Mezzi Meccanici e degli Arredamenti Portuali di Napoli has published the following figures regarding shipping at that port during the first three months of 1935, compared with those for 1934 and 1933:—

	No.	ARRIVALS AND CLEARANCES N.R.T.	Goods Unloaded and Loaded Tons	Ship's Stores and Bunkers Tons
1935 ...	4,174	6,068,007	569,179	76,736
1934 ...	4,091	5,705,501	485,257	76,339
1933 ...	4,104	4,855,229	459,347	75,419

As a whole, shipping at Naples during the first three months of 1935 has shown a larger progress than during the corresponding period of 1934, and the following figures show the position of the various countries trading at this port:—

	1934			1935		
Flags	No.	N.R.T.	Goods Unloaded and Loaded Tons	No.	N.R.T.	Goods Unloaded and Loaded Tons
Italy ...	1,725	3,657,305	287,879	1,927	3,989,218	314,880
Britain ...	157	693,224	41,507	146	679,652	41,398
France ...	30	124,330	10,181	32	140,793	14,009
America ...	54	271,641	15,039	46	249,769	11,735
Germany ...	46	170,536	13,570	42	119,783	11,318
Norway ...	58	91,156	21,562	49	55,164	19,179
Holland ...	32	115,870	16,503	35	138,589	5,809
Japan ...	26	169,162	3,229	28	183,032	12,732
Greece ...	27	38,978	25,708	27	45,593	33,952
Denmark ...	22	16,872	7,654	40	35,243	10,897
Spain ...	8	20,799	13,657	6	15,867	11,743
Sweden ...	16	31,572	3,160	24	47,960	10,158
Romania ...	10	32,688	12,437	23	62,195	28,987
Belgium ...	9	13,194	3,243	13	25,492	7,696
Jugoslavia ...	6	3,522	878	1	1,217	1,757
Russia ...	—	—	—	8	14,940	20,814
Other Countries ...	9	12,104	6,669	19	42,430	20,814
	2,235	5,462,953	482,876	2,466	5,846,937	567,903

Britain has maintained first place in regard to the number and tonnage of ships arrived and cleared, and in connection with the goods unloaded and loaded, but her position has been contended by Greece, which increased her share in the volume of goods unloaded and loaded.

Considerable interest is shown in regard to the future of the Port of Bari where the harbour extensions are nearing completion, and the outer harbour is already accessible to ships like the "Vulcania" and the "Saturnia" of the Cosulich Line of Trieste, which can land passengers alongside the breakwater sheltering the new basin. Shipping at the Port of Bari is shown in the following table:—

	No.	N.R.T.	GOODS Imported Tons	Exported Tons	PASSENGERS Arrived	Departed
1934 ...	3,998	3,585,946	318,994	50,423	9,348	7,656
1933 ...	3,563	3,501,215	271,103	52,696	7,386	7,064
1932 ...	3,932	3,260,183	312,507	199,616	8,685	7,592
1931 ...	3,470	2,930,429	321,788	59,382	8,615	9,172
1913 ...	3,566	2,322,463	316,895	91,503	6,864	5,107

In order to encourage the progress of transit trade from East to West and vice versa the Consiglio Provinciale dell'Economia Corporativa di Bari is studying the possibility of cutting down unloading and loading charges so as to make operations cheaper than elsewhere in the Southern Adriatic ports. On the area of the new port, concrete warehouses will be built in the course of next year, while electric cranes will be provided later on.

It is announced that important dredging works are in progress at Venice, and that steps are being taken to shorten the trip between Venice and the Brennero in order to increase Central European transit trade through the Port of Venice.

### Institute of Transport.

The Council of the Institute of Transport has pleasure in announcing that Sir Cyril Hurcomb, K.B.E., C.B., the Secretary of the Ministry of Transport, has accepted its invitation to become President of the Institute for the year commencing on October 1st, 1935.

### Finnish Harbours.

The Finnish harbour with the largest goods turnover in 1934 was Wiborg-Trangsund with exports amounting to 1,458,414 tons, as compared with the previous year's figure of 1,607,000 tons. The second largest was Kotka with 1,306,800 tons, followed by Kemi, Helsingfors, Raumo, and Björkö, in that order.

### Harbour of Rosario de Santa Fe, Argentine.

The harbour of Rosario de Santa Fe, which handled 19 per cent. of the total export trade of the Argentine in 1934, was entered in that year by a total of 1,278 steam, motor, and sailing vessels with a tonnage of 5,400,000 r.t., and cleared by 1,271 vessels with 5,370,000 r.t., most of them carrying full cargoes.

### Traffic at Chinese Ports.

The improvement in the volume of the traffic of the Lunghai Railway since the opening of the harbour at the end station of the line has continued in such a striking manner that the authorities have decided to carry out further plans for the extension of the facilities. To improve the loading and unloading arrangements they intend to erect a 1,000 kilowatt power station, and a number of additional loading cranes. The total cost of these works is estimated at \$2,000,000. At the same time, \$3,300,000 is to be spent on speeding up the traffic of the railway by the purchase of new carriages and locomotives.

The administration of Greater Shanghai has made plans for the construction of large new quays with storage sheds and railway connections with the Shanghai-Woosung section of the Shanghai-Nanking railway. The total length of the harbour front on the northern bank of the Whangpoo would be increased by some 3,000 yards. The cost is estimated at about 16,000,000 Shanghai dollars, a quarter of which would be spent on dredging and other preliminary operations, whilst about \$6,000,000 would be spent on the actual construction of the quays and docks of the cargo section of the harbour extension, and about \$1,000,000 on that of a special harbour for mail steamers.

In addition, plans have been made for the construction of a special harbour for the steam and sailing fishing fleets, together with that of a large wholesale fish market hall and a seven-storey building fitted with refrigerators to serve as a storage place, and also as offices for the various wholesale fish dealers.



## Reinforced Concrete as a Structural Material\*

By O. FABER, O.B.E., D.Sc. (Eng.)

**R**EINFORCED concrete is now so well known that it cannot in any sense be considered a new material, though it is constantly being applied to new uses. The material itself, however, is quite certainly well known to all the members of this Institution, and the Author will therefore confine himself to mentioning a few of its properties, advantages and disadvantages, in the light of present-day knowledge and experience; any reference to the history of its development in the early days will be omitted, as this has already been stated many times previously.

Reinforced concrete occupies a stronger position among the structural materials to-day than it did twenty years ago, because the advances which have been made in the technique of its use have been greater than with most of the older forms of construction with which it has sometimes to compete, such as constructional steelwork. This, of course, was only to be expected. As an illustration of the development, it is perhaps interesting to show how portland cement has advanced in the British standard specification since the First Report of 1904. Table I shows the requirements of the British standard specifications for portland cement at successive issues. Reviewing these figures generally it may be said at once that the neat cement tests are of little value as compared with the 3:1 sand/cement. Cement is not used neat, but as a material for cementing together particles of sand and stone, and its ability to do this is more correctly given by the sand/cement tests. The British standard specifications recognise this by now omitting the neat cement tests altogether. It will be seen that since 1904 the specified strength of the 3:1 sand/cement at seven days has risen from 120 to 375 lb. per sq. in. more than three times as much, and this represents in rough figures the progress in strength which has been made in this material in thirty years. As the strength of concrete is directly proportional to the strength of the cement with which it is made, these figures also indicate how much stronger modern concrete is than the concrete which could be made in 1904.

TABLE I.

		Strength of neat cement specimens lb. per sq. in.		Strength of 3:1 sand/cement specimens lb. per sq. in.	
		7 days	28 days	7 days	28 days
1904	...	400	500	120	225
1907	...	400	500	150	250
1910	...	400	*	150	*
1915	...	450	*	200	*
1920	...	450	*	200	*
1925	...	600	*	325	*
1931	...	†	†	375	†

\*A specified increase in strength is demanded, depending on the value of the 7-day test.  
†Omitted.

In the last few years cements have been made and are now in very extensive use which have the property of hardening much more rapidly. In the earlier cements, one with a strength of 150 lb. per sq. in. at seven days might have 250 at 28 days, showing that 60 per cent. of its hardening took place after seven days. Modern rapid hardening cements are now capable of giving a much higher proportion of their total strength in a few days, the total strength also being considerably enhanced. The Author's specification has for some years required from ordinary portland cement 3:1 sand/cement specimens, 400 lb. per sq. in. in seven days and 500 lb. in 28 days, and for rapid hardening cement, 300 lb. per sq. in. in one day, 500 lb. in three days, and 600 lb. in seven days. It will be seen that we can now get in one day a strength greater than was specified for 28 days in 1904.

The ordinary rapid hardening cement is a true portland cement in which the lime ratio has been slightly increased, and the cement has been prevented from becoming unsound in consequence by being more finely ground. One of the chief differences between a modern and the old-fashioned cement is this extremely fine grinding. This has, of course, added to the cost of manufacture, since approximately half the coal burned in making cement is spent on the grinding, but its effect on strength has been sufficiently demonstrated. Another cement which also has excellent rapid hardening properties is the aluminous cement; it has only come into extensive use in the last five years. In rapid hardening qualities it exceeds even the best of the rapid hardening portland cements, and it also has valuable properties in being more chemically inert to sea water and various other corroding influences, such as certain organic acids which are sometimes found in peat deposits and similar places. Its cost is unfortunately much greater than that of portland cement.

\*Paper read at a meeting of the Institution of Engineers and Shipbuilders in Scotland, and reproduced by their kind permission.

The figures previously discussed are mostly of 3:1 cement mortar tests in tension. We are however in practice much more concerned with the crushing strength of concrete, since in general the tensile strength is neglected and it is relied upon in compression only. This statement is not entirely accurate and there are important exceptions to it, but in the main it is correct. The testing of cement specimens in tension is therefore less satisfactory than crushing tests, and there is indeed no doubt that if a standard aggregate could be agreed upon, and cubes or cylinders made with definite proportions of cement, standard sand and standard aggregate, and tested in compression, the results would give still more accurately the real relative merits of different cements. The only objection to this course is the considerably greater expense involved. In the absence of this information it is useful to know that in rough figures the tensile strength of a 3:1 cement mortar is approximately the same as that of a concrete composed of one part cement, two parts sand and four parts aggregate—generally known as 1:2:4 concrete; and that the crushing strength of mortars and of concretes, as of all brittle materials, lies somewhere between 10 and 15 times the tensile strength. The exact ratio varies with several quantities, such as the water/cement ratio, which is now known to be one of the most important physical constants in any concrete, and with the age of the specimen. As an example, where a 3:1 sand/cement specimen fails at 600 lb. per sq. in. in 28 days, the 1:2:4 concrete would give a somewhat similar result, and the crushing strength would be about 6,000 lb. per sq. in. if the cement/water ratio could be maintained. Where, however, in practice a wetter concrete has to be used than would be suitable for testing purposes, then the strength of the resultant concrete will be to that extent reduced, and for this reason 5,000 or even 4,000 lb. per sq. in. is a more usual figure under average conditions.

The progress in the strength of concrete in the last few years is perhaps exemplified in the following figures. Under the L.C.C. Regulations of 1915 a 1:2:4 concrete had to show a crushing strength of 1,600 lb. per sq. in. in one month and 2,400 lb. in four months, and a working stress of 600 lb. per sq. in. was allowed. In the Code of Practice for Reinforced Concrete recently issued by the Committee appointed by the Department of Scientific and Industrial Research, to which the Author had the honour of being nominated by the Institution of Civil Engineers, the corresponding figures for high-grade concrete are 4,275 lb. per sq. in. for preliminary laboratory tests, 2,850 lb. per sq. in. for works tests taken throughout the progress of the work, and a working stress of 950 lb. per sq. in. This represents a development in the last 19 years. The differentiation between the preliminary tests and the works tests is a wise one, since the former relates to specimens cured at laboratory temperatures, while the latter relates to specimens cured at the chance temperatures and conditions of outside work, where it is well known that low temperatures retard hardening and make a concrete which will be permanently weaker than one cured at higher temperatures.

Since 1925 the Author has kept a record of the strength of cubes prepared during the rebuilding of the Bank of England, and tested at the ages of 14, 28, and 90 days, and the winter figures show considerable depressions on the curves as compared with the summer ones. Nevertheless, it is of interest to note that the lowest figures in 1926 were 1,400 lb. per sq. in. in 14 days, 1,800 in 28 days and 3,000 in 90 days, whereas in 1934 the lowest figures were 3,600 lb. per sq. in. in 14 days, 4,100 in 28 days and 5,500 in 90 days. It will be seen that these figures show most remarkable increases which are due almost entirely to the improvements in cement and concrete technique in the interval of only eight years. The highest in 1925 were 4,400 lb. per sq. in. in 14 days, 5,000 in 28 days and 6,000 in 90 days, while the highest in 1933 were 7,400 lb. per sq. in. in 14 days, 7,800 in 28 days and 8,800 in 90 days. The last figure is practically four tons per sq. in., which surely is a remarkable achievement for concrete of the same proportions as that for which the L.C.C. specified a breaking strength in 1915 of just over one ton per sq. in. after four months.

It is perhaps of interest to consider the corresponding development in connection with constructional steelwork. The material, mild steel, as defined by British Standard Specification No. 15, has still the same properties as it had while this enormous development in reinforced concrete was proceeding, that is, an ultimate strength of from 28 to 33 tons per sq. in., coupled with an absence of specification as to the yield point. It is, therefore, not to be wondered at that the only increase in working stresses which can be recorded is from 7½ tons per sq. in. in the L.C.C. General Powers Act of 1909 to eight







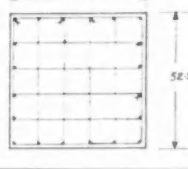
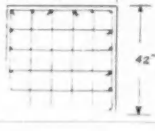
**Reinforced Concrete as a Structural Material—continued**

tons per sq. in. as recorded by the Code of Practice for the use of constructional steelwork in buildings, prepared by the Steel Structures Research Committee, of which the Author also had the honour of being a member in 1932. This code is now accepted by the L.C.C. under waiver. It will be seen that the working stress in reinforced concrete has been raised by nearly 60 per cent., while that for steelwork has been raised by approximately 6 per cent., from which it does not seem unreasonable to suppose that whatever was the ratio of costs between the two materials 20 years ago, it has since been increased in favour of reinforced concrete. This, indeed, is

specification, a yield point as low as 17 or 18 tons per sq. in. This question of the specified yield point is of primary importance, and if in B.S.S. No. 15 for mild steel the yield point could be specified as fixed at a figure of, say, 20 tons per sq. in., to which the manufacturers could work, the safe working stress on mild steel could be increased above eight tons per sq. in., but in the absence of a specified yield point no such increase can safely be allowed.

With steels of the Chromador type, with a specified yield point at a much higher figure, a safe working stress of 12 tons per sq. in. is advocated by responsible bodies. Table II shows

TABLE II.  
COMPARISON OF COST PER FT. OF COLUMNS TO CARRY 1,000 TONS ON 14-FT. HEIGHT.

		Cost per ft.			Cost per ft.
(a)	MILD STEEL ... L.C.C. Regs. 1909 Uncased		Steel	0.278 ton at £19	£5.28
(b)	MILD STEEL ... do. Cased		Steel	0.278 ton at £19	£5.28
			Concrete	0.102 cu. yd. at 40s.	0.204
			Formwork	0.89 sq. yd. at 6s.	0.267
(c)	MILD STEEL ... Code of Practice, 1932 Uncased		Steel	0.238 ton at £19	£4.52
(d)	MILD STEEL ... do. Cased		Steel	0.238 ton at £19	£4.52
			Concrete	0.079 cu. yd. at 40s.	0.16
			Formwork	0.8 sq. yd. at 6s.	0.24
(e)	"CHROMADOR" or similar Code of Practice Stresses + 50 per cent. Uncased		Steel	0.162 ton at £20 10s.	£3.32
(f)	"CHROMADOR" or similar do. Cased		Steel	0.162 ton at £20 10s.	£3.32
			Concrete	0.066 cu. yd. at 40s.	0.13
			Formwork	0.7 sq. yd. at 6s.	0.21
(g)	REINFORCED CONCRETE L.C.C. Regs. 1915 (with 2 per cent. main reinforcement)		Concrete	0.71 cu. yd. at 45s.	£1.6
			Formwork	1.94 sq. yd. at 6s.	0.58
			Reinforcement	1.86 cwt. at 13s.	1.21
(h)	REINFORCED CONCRETE (High grade) Code of Practice, 1934 (with 2 per cent. main reinforcement)		Concrete	0.454 cu. yd. at 45s.	£1.02
			Formwork	1.56 sq. yd. at 6s.	0.47
			Reinforcement	1.28 cwt. at 13s.	0.84

borne out by the facts when practical cases are examined. The Author recently made several visits to most of the European capitals and discovered that on the Continent the use of constructional steelwork in buildings is exceedingly rare, and that buildings of reinforced concrete are the rule and no longer the exception. Nor is that to be explained on the grounds that steel is cheaper in England than on the Continent, because the reverse is unfortunately true, French, Belgian and German steel being considerably cheaper than British steel. The reason is more probably to be found in our conservatism and the fact that the pressure of economic facts has not been so great in this country as abroad, and we have lagged much farther behind other European countries in recognising the inevitable.

There are, however, other developments in connection with constructional steelwork which deserve careful consideration. One of these is the manufacture and use for ordinary building construction of high tensile steels, exemplified by materials such as Chromador. The British standard specifications for steels of this type not only cover a large increase in the ultimate strength, but they now put the yield point as an essential test. As the real factor of safety in constructional steelwork must always in fact be limited by the yield, this means that an engineer now has a definite assurance as to the real factor of safety which, with mild steel under B.S.S. No. 15, where the yield was not specified, was not possible. Some mild steels passing the standard specification have a yield point as high as 24 tons per sq. in., and others, which still pass the standard

a comparison between various designs for a column to carry 1,000 tons on a storey height of 14 ft. under various conditions, as follows:—

- In mild steel to conform to the L.C.C. Regulations of 1909, without casing.
- Do. with casing.
- To comply with the Code of Practice without casing.
- Do. with casing.
- If designed of Chromador or similar steel with an increased working stress of 50 per cent. without casing.
- Do. with casing.
- In reinforced concrete under the L.C.C. Regulations of 1915.
- Under the Code of Practice for high-grade concrete.

For the purposes of costing, all the mild steel is taken at £19 per ton delivered and fixed complete, the Chromador at £20 10s., the concrete for casing at 40s. per cu. yd., the concrete for reinforced concrete at 45s. per cu. yd. and the shuttering at 6s. per sq. yd. The cost per ft. run in each case is given so that a fair comparison can be made.

It may of course be argued that constructional steelwork of heavy built-up stanchions can, under certain circumstances, be fabricated, delivered and fixed for less than £19 per ton, but it is equally true that concrete for reinforced concrete can in some cases be placed at less than 45s. per cu. yd., and the Author believes that the prices make a fair comparison under

### Reinforced Concrete as a Structural Material—continued

similar conditions. It will be seen from Table II that the costs of the steel stanchion vary from £5.28 to £3.32 per ft. uncased, and from £5.75 to £3.66 cased, whereas the comparable figures for reinforced concrete vary from £3.39 to £2.33. The high figures for steel are to be compared with the high figures for reinforced concrete, because they are both due to low stresses allowed by the earlier regulations, while the low figures of steel should be compared with the low figures for reinforced concrete as they are both subject to taking higher modern stresses. Bearing this in mind, it will be seen that the cost of reinforced concrete is approximately two-thirds of the cost of constructional steelwork cased, and something less than three-quarters of the cost of constructional steelwork uncased.

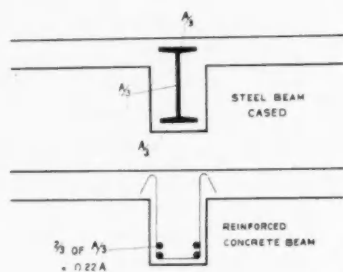


Fig. 1.

Fig. 1 shows a comparison between a steel beam cased and a reinforced concrete beam, the beams in both instances supporting a concrete slab. The cross sectional area of the joists may be divided approximately into three equal parts, the top flange, the web and the bottom flange respectively, the web depth being in general about twice the breadth of the flanges and the web thickness about half the flange thickness. In the reinforced concrete beam the top flange of the joist is omitted, as the compression is carried by the slab which is required in any case. The web of the steel beam is also omitted as the shear is carried by the normal tensile reinforcement being bent up at an angle towards the ends, where it is no longer required to resist bending moments. The weight of steel in stirrups is normally very small. The tensile reinforcement replaces the steel in the bottom flange of the steel joist, but is normally only about two-thirds of its area since constructional steelwork is generally designed for the full free bending moment,  $Wl/8$  between the supports, while reinforced concrete, being part of a continuous structure, is generally designed for less than two-thirds of this moment, that is,  $Wl/12$ , or less. From this it will be seen that the weight of steel in a reinforced concrete beam of this character is generally about one-quarter of the weight of steel in a steel beam to carry the same load on the

same span, the amount of concrete and shuttering being practically constant in both cases. For this reason it is easy to understand that the cost of reinforced concrete T-beams is also only about two-thirds the cost of steel beams cased.

In some large buildings recently erected at Avonmouth, in spite of all the floors having been designed for the heavy load of 3 cwt. per sq. ft., and being finished with maple, the cost per cu. ft., apart from the cost of special piled foundations, was 6d. per cu. ft.; buildings designed with similar loads and finishings normally cost approximately 1s. This was only possible by the use of reinforced concrete and careful design. The whole of these buildings were founded on piles of reinforced concrete 66 ft. in length and 16 in. square, each pile carrying a load of 60 tons. The piles were driven with a hammer weighing over four tons and dropping about 4 ft., so that the blow was never less than 20 ft.-tons, and they were driven until the settlement did not exceed 1 in. for twenty blows. This corresponds to a load which would not produce a settlement of over 200 tons per pile. Such piles are much more permanent and are cheaper than timber, and it is doubtful whether timber piles of that length could be obtained except at a fabulous cost.

Modern bridge building has frequently been greatly facilitated by the technique only rendered possible by the skilful use of reinforced concrete. In the construction of the great bridge across the Lim Fjord, the foundations were built on hollow concrete piles of 25 in. outside diameter and just over 3 in. thick, some of the piles being as much as 120 ft. in length, and they were tested with a load of 200 tons each and driven with a 6-ton steam hammer. Hollow reinforced concrete caissons were floated round and lowered on to the tops of these piles and subsequently filled with concrete, this method of construction enabling the work to be carried out in the sea at a depth of from 35 to 40 ft.

Reinforced concrete was used to some extent in the construction of ships in Norway and also in this country, especially during the war, chiefly with the object of using as little steel as possible. In the Author's opinion reinforced concrete is entirely unsuitable for this purpose since, though it is quite possible to make a thoroughly sound concrete ship and even to insure it satisfactorily, it will be considerably heavier than the steel ship and consequently will have a lower earning capacity in the cargo that it can carry for a given expenditure on crew, fuel, etc. This consideration does not of course apply to its use for caissons in bridge construction, and for this purpose it is exceedingly suitable and economical. Reinforced concrete caissons were adapted in the construction of the Elorn Bridge, Brest, which had many interesting features. It consists of three arches of 590 ft. span, and the concrete was cast on timber arches stiffened with steelwork which were floated out into position on concrete pontoons.

### Bombay Port Trust

At their meeting held on 7th May, 1935, the Board considered a draft amendment of the Bombay Port Trust Act to provide, on the lines of the other Major Port Trust Acts, that debenture loans issued by them shall constitute a first charge on the income and property of the Trust, and decided to approach Government to take the necessary legislative action.

It was also decided to apply to Government for sanction to issue a 30-year loan for Rs. 15 lakhs at  $3\frac{3}{4}$  per cent. to finance the budgetted capital expenditure during 1935-36. If sanctioned, the loan will be taken up internally for investment of fund balances, and will be liquidated by half-yearly instalments to a sinking fund on a 3 per cent. basis of improvement.

In pursuance of a programme approved in 1928 for the periodical overhaul of all dock cranes, the Board sanctioned an expenditure of Rs. 5,000 for special repairs to cranes in Alexandra Dock during 1935-36.

\* \* \* \*

Imports and exports at the Port of Bombay:—

Quarter ended March	1933-34			1934-35		
	Import Tons	Export Tons	Total Tons	Import Tons	Export Tons	Total Tons
Docks ...	496,094	463,829	959,923	476,546	414,093	890,639
„ (trans-shipment)	21,883	76,270	98,153	27,013	45,219	72,232
Bundars ...	274,998	84,267	359,265	341,229	103,255	444,484
Total for Quarter ...	792,975	624,366	1,417,341	844,798	562,567	1,407,365
Total for year ...	2,974,338	2,297,374	5,271,762	3,168,671	2,271,870	5,440,541

Vessels other than ferry steamers, hired transports, Government vessels and country craft, which entered the Port of Bombay:—

Quarter ended March	1933-34		1934-35	
	No.	Net Register Tonnage	No.	Net Register Tonnage
Vessels engaged in foreign trade ...	231	1,067,479	220	1,027,136
Vessels engaged in coasting trade ...	704	616,808	704	628,481
Total for quarter ...	935	1,684,287	924	1,655,617
Total for year ...	3,035	6,074,970	3,077	6,089,733

### Seaborne Goods Traffic of the Lower Weser Ports.

(The figures in brackets show traffic in previous year).

Total goods turnover of the Lower Weser Ports in sea-borne traffic in January, 1935, according to the Statistical Office in Bremen, amounted to 737,717 tons (December, 1934, 694,670 tons), or 6.2 per cent. more than that of the previous month. Volume of goods at 300,241 (322,551) tons did not quite reach the extent of December's. However, this decrease was more than counterbalanced through an increase in exports by 56,357 tons to a total of 428,476 tons. Exports have thus increased by 15.1 per cent.

Of the total receipts of the Lower Weser Ports 273,589 (286,388) tons, or 88.5 per cent. (88.8 per cent.) were discharged in Bremen ports. This shows a decrease of 4.5 per cent. of goods received, which is due chiefly to smaller arrivals of phosphate, metals and metal goods, rye, barley, oats, timber, cellulose and coke. On the other hand, somewhat larger quantities of vegetable spinning materials, wool, maize, rice, fruit and southern fruits, and in particular of mineral oils, were discharged.

Of the total exports from the Lower Weser Ports 343,717 (291,675) tons, or 80.2 per cent. (78.4 per cent.) were loaded in January, 1935, at Bremen ports, an increase of 17.8 per cent., composed mainly of increased shipments of iron, and iron goods, vegetable spinning materials, stones and earth, artificial nitrogen manures, oils and fats, and coals. On the other hand, there was a decrease of exports of potash salts, metals and metal goods, fruit and southern fruits, cellulose and wooden goods.



## Better Port Co-ordination

**D**OCK transport problems have been engaging attention at the annual congress held at Liverpool, on May 15th-17th of the Industrial Transport Association. The theme of all the meetings was "transport planning in the new age."

"Better port co-ordination" was discussed by Mr. J. A. Dunnage, who, in a preparatory remark, said he had set out to be provocative. The port situation revealed a total absence of planning on a national scale, and in consequence there was going on, week after week, an enormous waste of resources, which if boldly stopped at its source, could materially improve the position of every British industry. Around our comparatively small coastline there were 542 ports and harbours, and Board of Trade Blue Books listed 171 ports, of which about 120 had material importance.

"Many millions of capital are invested in port structures and machinery, and each port is governed by a body whose prime duty is to earn a return on the money of stock holders, invested in that particular port, or to make the demand for rate aid to meet a deficit as small as possible. This may lead them to engage in expensive competition to secure traffic passing by a neighbouring route, involving perhaps the provision of costly new facilities which, when completed, render idle the like type of facility already installed at the port which loses the traffic. In other cases, the free play of competition may force a particular port management to forbear to provide equipment which is urgently needed by traders, because the cost cannot readily or wisely be incurred."

He submitted that the time is quickly coming, if not already here, when some measure at least of genuine national planning will have to be applied to ports.

"We must work for a legal enactment grouping the ports, much as railways were grouped; and it may well be sounder to jump a stage and propose a national direction of ports under an expert Board. The all-important decisions as to which areas shall be favoured for port development and which discouraged, turn mainly upon a study of existing facilities, a decision as to which are working with greatest efficiency, and which are becoming obsolescent."

"How far the unification of port charges, at which some reformers aim, would be made less difficult under these proposed conditions is not at all clear, for that very desirable topic bristles with material complications. Some 25 years ago the then newly-formed Port of London Authority sent an expert charges officer to visit certain other important British ports and prepare comparative statements of the charges in force thereat for six main import traffics. A comparison based on schedules alone, without knowledge of the actual services comprised in each rate, and the differing customs of the trades at each port, was clearly quite valueless—and still is—and this was intended as one of several preliminary steps to a scientific revision and unification of the port charges. The more thorough this officer's researches the more complex his problem seemed to be. After many more months of expert labour, the task was set aside temporarily while the practical needs of the moment were met by quite empirical revisions of many of the tariffs.

"Port charges depend not on a mere 'labour-and-materials' cost which might more or less be averaged for all ports, but, to a marked degree, on the very heavy but vastly different overhead costs involved in the development and maintenance of

each individual port, and on the radically different 'customs of the port' affecting the discharge and working of cargo; customs which are clung to with amazing tenacity by one or another inevitably self-centred interest.

"Very fundamental legal changes will be needed to ensure the pooling of physical resources and the simultaneous pooling of revenues to meet capital and sinking fund charges. Only bracketed with such drastic financial steps can one require port authorities to unify their main tariffs, but as part of such changes it should be quite feasible."

Suggesting a National Port Advisory Board, Mr. Dunnage said this would come as less of a shock to industrial opinion, accustomed as it is now to boards of control for many purposes; while as for the view of port officials, themselves, some minds are evidently working that way, since those who in 1919 so strongly opposed Sir Eric Geddes' plans for the establishment of a Ministry of Ways and Communications are now, in essence, advocating what he had in mind.

"Mr. Bevin's National Control Board would not have anything to do with the question of the management of the individual ports, but rather would be a survey board or a board which would take a view of the industry as a whole in so far as the new developments and capital expenditure were concerned; that is to say, they would have some check on unwise capital expenditure and would survey and determine the normal requirements of the country. For this purpose they should always have before them the requirements of the whole country and be in constant touch with the movements of industry and population, the development of new industries, the requirements of coastal trade and other water communications, etc.

"Frankly, this over-riding advisory control body alone does not greatly appeal to me, for surely each time it suggested anything of material value it would be faced with the most vehemently expressed opposition, backed by political wire-pulling, from the area which was required to curtail an activity or change a policy in the general interests; and, naturally so, since that authority's duty to its shareholders might be interfered with by the action suggested by the control board. Clearly there is no real way out but to follow the 'working model' of a merger of competing transport interests already provided by the London Passenger Transport Board."

### Traffic in Harbour of Reval, Esthonia.

Owing to the unusually early breaking up of the ice and the increasing volume of exports, traffic in the harbour of Reval was considerably livelier in March, 1935, than in March, 1934, 49 vessels with 32,564 n.r.t. entering, and 50 vessels with 31,936 n.r.t. clearing in the former month, as compared with 40 vessels with 28,987 n.r.t. entering and 38 vessels with 25,744 n.r.t. clearing in the latter.

### The Harbour of Libau, Latvia.

In the first quarter of 1935, 133 ships with 75,589 r.t. entered the harbour of Libau, and 116 ships with 54,389 r.t. cleared. Including goods in transit, the total imports during the period January-March, 1935, amounted to 27,676 tons, as against 39,838 tons in October-December, 1934. Exports over the same periods amounted to 31,554 tons and 19,432 tons.



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## North-East Coast Notes

### Tyne and Oil Cargoes.

THE decision of the River Tyne Commission at their April meeting when, by fifteen votes to eight, they resolved not to allow petroleum spirit in bulk to be discharged above Newcastle bridges, has met with some criticism.

It will be remembered that the Anglo-American Oil Company, Ltd., sought permission to import petroleum spirit in bulk into the Tyne in full cargoes up to 1,000 tons, or part cargoes up to 500 tons, in 1,000-ton coasting tankers, for discharge at the Company's wharf at Elswick. The Harbour and Ferry Committee, in January, resolved that the application was one which could not be accepted. Subsequently the question was reviewed with later information by the Harbour and Ferry Committee and the River Works Committee meeting jointly, and by a majority of one vote it was recommended that the application be granted, subject to conditions which included provisions that discharging and loading be performed only between sunrise and sunset, that the passage through the bridges be during the hours of daylight, and that the Harbourmaster be given four hours' notice of arrival of the vessel.

At the meeting of the Tyne Commissioners referred to, the Chairman (Mr. H. P. Everett) formally moved and the Lord Mayor (Councillor R. S. Dalglish) seconded the adoption of the report of the joint committee.

Alderman T. Sykes, who was chairman of the Committee, spoke against the resolution, urging that to allow self-propelled vessels carrying 1,000 tons of oil above bridges would be a serious menace. He was anxious to encourage trade, but they must bear in mind the possibility of increasing risk and the ignoring of the safety which was essential for other parts of the river.

Sir George Lunn said the problem was reduced to small proportions. Conveyed in a dumb barge, the oil could go above bridge, but they were asked to say it must not be conveyed in a self-propelled vessel. He hoped they would not stop a chance of developing trade in the upper reaches of the river, particularly when they were contemplating spending large sums on quays in the lower reaches.

The Chairman said he was against petrol coming up stream above Jarrow Quay corner, and Colonel Taylor and Mr. W. A. Souter also opposed the report.

An amendment by Alderman Sykes that the application be not entertained was carried by fifteen votes to eight, and the joint committee's recommendation rejected.

Speaking later, the Lord Mayor of Newcastle (Mr. R. S. Dalglish) criticised the decision of the Commissioners, and said "Ports like London, Manchester, Southampton and even Gloucester, allow petrol to go right up the river, while we close the door. Petrol has been stored at Jarrow for years, and yet we stick to our old-fashioned policy of keeping it there. Here we are crying all over the world for new industries to come to the Tyne, and we are actually stopping the development of industry. It is time we learned that there are other industries in the world to-day besides coal, iron, shipbuilding and engineering, and that these industries are the industries of the future."

### Tyne's Coal Trade Reviewed.

The Lord Mayor, at the meeting of the Tyne Commission, said the coal and coke shipments for the river in the past quarter were down nearly 250,000 tons on the corresponding period last year. That month, however, there had been considerable improvement and the deficit had been reduced to 136,000 tons. There was no ground for undue pessimism. In the first quarter of the year there was a decrease of 150,000 tons at the Commissioners' shipping places. It was mostly in respect of foreign trade. Shipments decreased to France, Italy, Holland and Norway, but as a set-off, there had been more trade to foreign coaling stations. It was difficult to forecast the trend of trade. The Italian trade decree, reducing imports of coal to 80 per cent. of the 1934 figures, resulted in a decrease of nearly 77,000 tons from the Tyne in January and February, but in March the decrease was only 11,000 tons over the corresponding period last year. It did not follow that shipments from the Tyne to Italy would be reduced by 20 per cent., as the quantity would depend entirely on the class of coal required by Italy. General merchandise in the Tyne had slightly improved.

### Reconstruction of Graving Dock at Hebburn.

After more than a year's work, Messrs. R. and W. Hawthorn Leslie and Co., Ltd., Hebburn, have the satisfaction of seeing completed the task of reconstructing and bringing up to modern requirements their graving dock. The work of enlarging and widening the dock has been carried out by

Messrs. J. G. Thompson and Sons, Ltd., South Shields, to the designs of Messrs. J. Watt Sandman and Son, Newcastle, and the firm now possesses one of the most modern dry docks in the country. The dock length is now 503 ft., breadth 66 ft., and depth 23 ft. 6 in. Particular consideration has been given to the rapid emptying and filling and starting of repairs with the greatest dispatch, and the arrangements and the equipment are of the most modern type. These include a new pump-house with modern electric plant, railways along each side, and electric cranes up to 21 tons lifting capacity.

### Sunderland Quay Development.

An important development at Sunderland deep-water quay is the construction of the oil installation. Whessoe Foundry and Engineering Company, Ltd., of Darlington, secured the contract, and are to construct five tanks of a total capacity of about 4,300 tons for storing heavy oil—fuel oil, Diesel oil, engine oil, and gas oil. When the installation is completed in about six months' time, oil-burning vessels will be able to obtain bunkers at the quay. The cost of the installation is £17,588.

The trade report for the Wear for the first quarter of the year shows a decrease of 61,882 tons in the fuel exports, the totals being 1,001,695 for 1935, compared with 1,063,577 in 1934. Imports in the same period show an increase of 2,305 tons at 59,585 tons, against 57,280 tons in 1934. Exports other than coal at 10,319 tons are down 6,222 tons.

### Meeting of the Blyth Harbour Commission.

At the April meeting of Blyth Harbour Commission the tender of Messrs. Brims and Co. was accepted for the building of two water tanks on the north side of the river—one to replace an existing tank, and the other near the West Staiths for the purpose of improving the supply of fresh water to ships using the upper harbour. The Chairman submitted particulars of the coal shipments during the three months ended 31st March, with comparative figures for 1934 and 1929, as follows: 1935—1,578,853 tons; 1934—1,637,440 tons; 1929—1,322,411 tons. The totals show a decrease of 4 per cent. on 1934 and an increase of 19 per cent. on 1929.

### Annual Dinner of the Institute of Transport.

The Institute of Transport announces that its next Dinner will take place at the Connaught Rooms, Great Queen Street, London, W.C.2, on Friday, February 21st, 1936.

### Britain's First Cargo Port and Second Passenger Port.

Sir David J. Owen, General Manager, Port of London Authority, lectured on the Port of London recently to members of the United Wards Club of the City of London at Cordwainers Hall. In the course of a general survey of the Port's activities, he mentioned that, in terms of value, London deals with 42.4 per cent. of the whole country's imports, over 25 per cent. of the exports and 56.6 per cent. of the re-export and entrepot trade, representing the handling of 39,240,000 tons of goods. London accounts for 22 per cent. of the total passenger traffic, and is the second most important passenger port for the United Kingdom.

### New Publications.

Messrs. Robert Boby, Ltd., of Bury St. Edmunds, England, have recently issued two new publications, both of which are very attractively produced.

Folder M.H. 42 describes materials handling plants, and steel constructional work, and contains 25 illustrations of various plants constructed by Robert Boby, Ltd. The illustrations depict coal, coke and grain handling plants, portable conveyors and elevators, etc.

The other publication is known as I.C. 102, and gives a very good description, suitably illustrated, of indented cylinders for wheat, barley, oats, rice, clover, grass, etc.

If any of our readers are desirous of obtaining copies of these publications, they can do so by applying to Messrs. Robert Boby, Ltd., and mentioning this journal.

\* \* \* \* \*

Messrs. Head, Wrightson and Co., Ltd., of Thornaby-on-Tees, England, have recently issued an illustrated brochure on dredger equipment.

This brochure has been compiled to enable those who build and those who are responsible for the upkeep of dredgers to order steel and alloy steel castings and forgings easily, and the brochure fully describes various spare parts for the upkeep of dredgers.

The brochure is suitably illustrated, and any of our readers who are desirous of obtaining copies can do so by writing to Messrs. Head, Wrightson and Co., Ltd., and mentioning this journal.

## Improvements at Mersey Cattle Wharf

Mersey Docks and Harbour Board has just completed a somewhat costly scheme for the improvement of the cattle-handling facilities at Woodside Lairages. To ensure the better working of the Cattle Wharf, the Board arranged for certain accommodation at the Wallasey portion to be withdrawn and have substituted in lieu thereof commodious and up-to-date accommodation at the Woodside portion of the lairages. Thus,

Ministry of Agriculture as a landing place for Canadian cattle and for animals from Ireland and the Isle of Man. The development of the trade has been enormous, and to-day the wharf has accommodation for 6,430 head of cattle and 12,300 sheep. All the recent improvements in connection with this important trade have been introduced, not the least of which are the extensive chill rooms provided.



*Improvements at Birkenhead Lairages for Accommodation of Sheep.*

all Irish sheep and lambs as well as cattle are now accommodated at Woodside instead of being divided between the two lairages as has hitherto been the case.

Perhaps it should be explained that the two lairages, Wallasey and Woodside, which are officially known as the Mersey Cattle Wharf, were first established in 1879 to deal with the import of livestock from abroad, the primary object being to isolate foreign animals so that no disease could be carried to the cattle of this country. The wharf is approved by the

The Woodside Lairage provides room for about 3,920 cattle and 8,200 sheep practically under one roof. There is no doubt these new arrangements will prove of valuable assistance and convenience to sheep and lamb buyers.

A regular service of trains is available to all parts daily, and convenient loading berths for motor wagons have been installed. During the year 1934, over 206,000 cattle and 258,000 sheep arrived at Birkenhead. The photograph shows the interior of a typical section of the new accommodation.

## Port of Southampton Topics

### *Docks Statistics for April show Advances.*

**S**OUTHAMPTON Docks statistics for April are the best for a long time, and coming after the quiet winter months bring a very cheering atmosphere.

The returns show that the volume of traffic handled in the docks was greatly in excess of the total for April, 1934, indeed, not for a long time has there been more general and more substantial increases than those now recorded. Additional satisfaction can be felt by reason of the fact that the increases have been recorded in all the most important phases of port activity.

The figures show that many more ships used the docks, that there was a big advance in the tonnage handled, in imports and exports, and also in the total of passengers who passed through the port.

The number of inward vessels dealt with in April was 229, as compared with 196 in the corresponding month last year, and outward the figure was 231, as against 194.

Such returns, as might be expected, lead to increases in the volume of tonnage handled. Inward gross tonnage amounted to 1,229,814 tons, compared with 1,139,886 tons in April, 1934—a rise of 159,928 tons—and the outward total was 1,215,752 tons, compared with 1,163,566 tons, an increase of 52,186 tons.

The net figures were also most satisfactory. An increase of 103,822 tons was recorded inward and an increase of 45,758 tons outward. The net tonnage totals were 704,884 tons inward, as against 601,062 tons, and 661,033 outward, compared with 615,275 tons.

The most gratifying return of all is that in respect of cargo. For years the Southern Railway Company have been striving hard to attract more freight to Southampton. They have been waging a difficult war in this respect, for every port in the Kingdom is equally anxious not only to retain the traffic it has had in the past, but to gain any extra freight which may be moving.

Southampton, however, appears to be winning the battle for

greater recognition as one of the big cargo ports of the country, and the April figures strengthen this view.

During April imports totalled 40,257 tons, and exports 27,977 tons. In April, 1934, the figures were 28,079 tons and 24,833 tons respectively, so that the increases are substantial, being 12,178 for imports and 3,174 for exports.

The passenger statistics are equally gratifying. There were 16,938 travellers inward, as compared with 15,744, and outward the total was 14,209, against 10,296. The increases were, therefore, 1,194 inward and 3,913 outward.

This reassuring position must be largely attributable to the increasing use which is being made of Southampton as a cruise port. It is fortunate that Southampton is thus highly favoured, for the North Atlantic season is not likely to be very much more successful this summer than last.

Factors which have played a part in bringing about the passenger increase include the inauguration of the Cunard White Star Line's super cabin service which has brought the Britannic and the Georgic from Liverpool to the Channel ports, and the inclusion of Southampton as the British outward port of call in the French Line's services to New York and the West Indies, Trinidad, and Panama.

The position during the coming months should be further improved, for the North German Lloyd's service to the Far East will be bringing additional traffic.

### *Hamburg-America Line.*

It has been decided by the Hamburg-America Line to place another vessel on the service between Southampton and Cuba and Mexico. Hitherto, the only ship to call at Southampton has been the "Orinoco," but the motor-ship "Iberia" is to join her in July, and the service will then be on a monthly basis.

In connection with this service the Hamburg-America Line are making a feature of trips to Santander. Quick passages at special rates are to be made by the two vessels sailing out of Southampton, and by the "Cordillera" and "Cariba," which will use Dover.



## News from all Quarters

### South Africa

The traffic through the main ports of South Africa for the month of February, 1935, will be seen from the following table:

No. of Ships	Cape Town	Port Elizabeth	East London	Durban
Freight in Tons—	164	77	92	148
Unloaded ...	88,715	46,098	28,836	113,479
Loaded ...	48,116	19,971	17,625	261,182
Reloaded ...	580	43	3	630
Total ...	137,411	66,112	46,464	375,291

Cape Town, once the premier base of the Antarctic whaling fleets, is in danger of being wiped off the map as a port for the repair and overhaul of whaling ships during the Antarctic winter.

Messrs. Irving & Johnson, Ltd., the Cape Town whaling and trawling firm, who own the factory ship "Tafelberg," and her whale catchers, which are shortly due from the Antarctic, announced that they have abandoned Cape Town as a whaling base this season. Instead, the factory ship and whalers will go to Norway for their repairs.

This means that only one factory ship, the British-owned "Hectoria," will leave her whalers at Cape Town for overhauling and repairing this year.

The decision of Messrs. Irving and Johnson came as a great surprise in Cape Town. This Company's catchers have been laid up at the Cape port for their overhauls and repairs each winter since the Company started whaling in the Antarctic in 1930, and they have provided employment for a large number of men during their six or seven months' stay, whilst thousands of pounds have been distributed in wages, harbour dues, and stores and equipment. As the vessels fly the South African flag, it has always been taken for granted that they would continue to make a South African port their base. Cape Town will lose between £12,000 and £15,000 this season as a result of the decision.

### Canada

A plan proposed by the Montreal Harbour Commission for transferring the harbour for passenger steamers to a site some five miles to the east of its present position is being keenly debated. The scheme was thought out shortly after the publication of the Government Employment Creation Programme, under which \$3,500,000 were allotted to the harbour of Montreal. At the proposed new site, the water level is considerably higher, and, owing to the softer nature of the river bed, dredging operations would be easier to carry out. The dredging urgently required at the present harbour, on the other hand, could not be carried out without endangering the piers and other constructions. Another reason put forward in support of the scheme is that the current at the proposed site is comparatively negligible. The detailed plans, which are now in the hands of the Marine Department, provide for eight new piers, and facilities for the simultaneous docking of forty vessels. No changes are at present suggested in the arrangement of the harbour for cargo steamers.

### Poland

As a result of the continued decline in the turnover of Polish foreign trade, the traffic in the harbour of Gdingen, which had reached the high figure of 714,000 tons in March, declined in April by 125,000 tons to 589,000 tons, thereby falling for the first time in the current year below the figure for the corresponding month of 1934, which was 600,000 tons. The export turnover decreased by 13 per cent., or 73,000 tons to 493,000 tons, and the import turnover by 30 per cent., or 43,000 tons to 96,000 tons. For the first four months of the year, however, the total turnover of 2,373,000 tons is still 10 per cent. higher than that for the same period of 1933.

The new Gdingen wood harbour, which was already partly in operation at the beginning of April, was officially opened on May 12th, and is now working to its full capacity. It was constructed by the "Paged" organisation (the wood export agency of the Polish State Forestry) on the so-called Gdingen industrial canal. It has an area of 132,000 sq. metres, with a bank length of 637 metres. It is fitted with two landing stages 140 and 160 metres broad respectively, and has a concrete quay 210 metres long on which the wood can be transferred direct from the trains to the ships.

### Japan

An ambitious plan has lately been made for the combination of the harbours of Osaka and Sakai, which are at present 6½ miles apart. In this way, it will be possible to make fuller use of the southern section of the Bay of Osaka. It is proposed to commence the work by constructing two breakwaters at Sakai, 957 and 2,750 yards in length respectively.

Since the great earthquake in 1923, which affected Yokohama much more seriously than Tokio, considerable progress has been made with the improvement of the harbour of the latter city, which is situated on the estuary of the Sumida River in the Bay of Tokio. Under the latest construction programme, 33,000,000 Yen is to be allotted for the improvement of the harbour. Among the first of the works to be undertaken will be the lengthening of the Takeshiba-Machi Pier by 1,188 ft. Work is at present in progress on the roofing over of the Shibaura Pier, and is shortly to be commenced on a swing bridge over the Kachidoki. To-day, 56 per cent. of all the goods to be consumed in the city reach Tokio by water; and one of the largest industrial centres in the East is developing around the harbour. The following table, issued by the Harbour Construction Committee of the City of Tokio, shows the extraordinary extent to which Tokio depends upon receiving and despatching goods by sea:—

TRAFFIC OF TOKIO IN 1934  
(In 1,000 Tons)

	Incoming Traffic	Per cent.	Outgoing Traffic	Per cent.
Coastal Shipping ...	4,200	36	660	21
Ocean-going Shipping ...	2,300	20	80	3
State Railways ...	4,550	39	2,020	66
Private Railways ...	640	5	280	9
River Shipping ...	40	—	40	1
Total ...	11,730	100	3,080	100

### French Possessions

During the month of March the goods turnover in the harbour of Tunis fell, as compared with the February figure. Imports amounted to 27,138 tons, as compared with 28,836 tons in February and 36,308 tons in January, and exports to 23,845 tons, against 25,593 tons in February and 18,253 tons in January. These figures do not, however, include the exports of iron and phosphates, which are reckoned separately.

The following table shows the harbour traffic of Algiers during the years 1934 and 1933:—

	1934	1933
Entering ...	No. of Ships 4,114 Tonnage in 1000 BRT 8,338	No. of Ships 4,038 Tonnage in 1000 BRT 7,517
Clearing ...	4,107 8,344	4,329 7,525

The number of tourist steamers entering the harbour during the year 1934 was 124, as compared with 121 in the year 1933.

The traffic in the harbour of Oran during the same periods was as follows:—

	1934	1933
Entering ...	No. of Ships 4,678 Tonnage 7,734,142 BRT	No. of Ships 4,794 Tonnage 7,857,300 BRT
Clearing ...	4,678 7,734,875 BRT	4,783 7,846,812 BRT

The goods turnover amounted to 1,274,166 tons entering in 1934, as compared with 1,299,229 tons in 1933, and 1,472,171 tons clearing, as compared with 1,341,884 tons in 1933. In addition, the harbour was visited by 1,307 vessels with 2,711,072 b.r.t. for bunkering, and by 1,314 vessels with 1,467,926 b.r.t. in the Algerian coastal traffic.

### U.S.S.R.

In order to cope with the increased traffic, considerable extensions have been made and new facilities provided in the four principal harbours of Trans-Caucasia, Baku, Batum, Poti and Suchum. It is officially stated that 32,600,000 roubles have been spent on these works during the past four years. The most important are those recently completed in the harbour of Baku, which has been developing rapidly as a centre for the transport of naphtha, 12,400,000 tons having been despatched in 1934, as compared with 7,500,000 tons in 1933 and 4,750,000 tons in 1913. In addition to the improvements in the harbour of Baku, which included the provision of additional storage tanks, progress has lately been made with the construction of an entirely new port for the handling of naphtha on the northern coast of the peninsula of Apsheron. The coastal traffic for the shipping of naphtha from Batum to White Russia and the Ukraine has also increased considerably of late years. The following table shows the development of the goods turnover of the principal harbours of Trans-Caucasia during the past four years:—

	1931	1932	1933	1934
Baku ...	6,530,000	6,660,000	8,293,100	13,291,500
Batum ...	3,972,000	4,602,000	4,627,300	4,960,000
Poti ...	861,000	751,000	983,300	1,096,300
Suchum ...	84,000	116,000	140,200	160,000
Total ...	11,447,000	12,129,000	14,043,900	19,507,800

## The Liverpool Observatory and Tidal Institute

THE Liverpool Observatory was erected on the site of the Waterloo Dock, Liverpool, in the year 1845, by the Liverpool Corporation, who were then Trustees of the Liverpool Docks, as a result of public demand, with the principal object of supplying accurate time to the port. Upon the Mersey Docks and Harbour Board being constituted in 1857, the Observatory was taken over by that body, together with the Dock Estate as a whole, and in 1867 was transferred to the large building on Bidston Hill, where it has remained ever since. This building was specially designed for the accurate measurement and distribution of time, and for the testing of ships' chronometers. The time-gun on the pier of the Morpeth Dock, Birkenhead, is in electric contact with one of two standard clocks in the Observatory, and has been fired regularly since 1867. Chronometers and sextants have always been tested and certificates supplied, and at the present time the amount of this work is increasing. The time, however, is not now obtained by the observation of the transit of stars, but by the rhythmic signals issued through the Post Office Wireless Telegraph Station at Rugby from the Royal Observatory at Greenwich. Meteorology has always figured prominently in the daily work of the Liverpool Observatory, and there is a steady demand from local bodies for extracts from the weather diary. From about 1910 a seismograph has been kept in continuous operation.

The Tidal Institute was founded, in 1919, by the University of Liverpool, with funds provided by Sir Alfred A. Booth, Bart., and Mr. Charles Booth. Its object was to prosecute continuously scientific study of all aspects of knowledge of ocean tides, with a special interest in improving the accuracy of tide-tables, and to carry out tidal work for Governments, Harbour Authorities and other bodies. During the period of its expansion it was generously supported by the Liverpool Steam Ship Owners' Association and by individual ship owners of Liverpool, while it also received grants from the British Association for the Advancement of Science, and from the Government Department of Scientific and Industrial Research.

In 1929 the Liverpool Observatory and the Tidal Institute were amalgamated into one institution governed by a Joint Committee of the Mersey Docks and Harbour Board and of

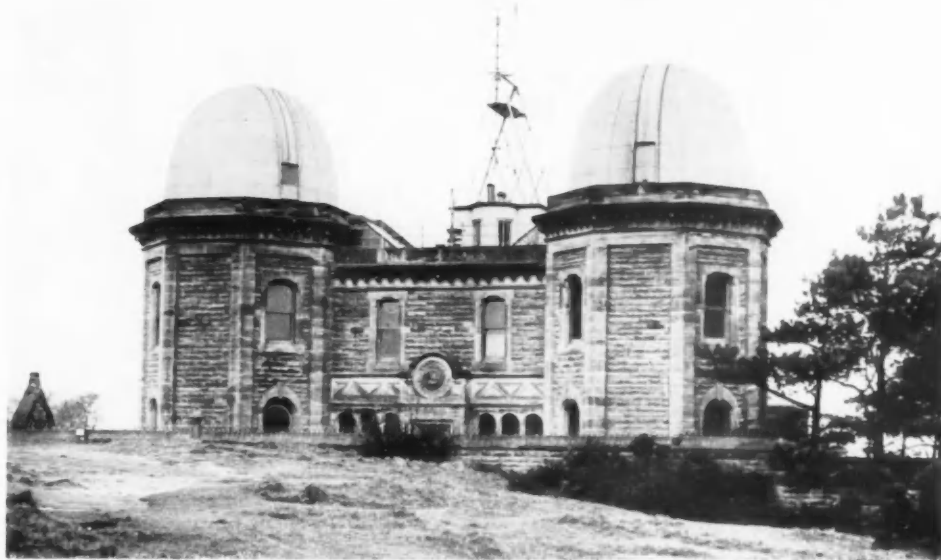


Fig. 1. Observatory Building.

the University of Liverpool. There quickly followed a rapid increase in the amount of practical tidal work carried out, and at the present time more tide-tables are made at Bidston than at any other single institution in the world. During 1934 seventy-four yearly sets of tidal predictions were made, mainly of times and heights of high and low waters, but also including hourly heights of water and times of slack water of tidal streams. Of these sets, thirteen related to ports in Great Britain, fifteen to stations in Canada, seven to ports in New Zealand, seven to ports in Australia, and the remainder to ports distributed over the world, mainly, but not exclusively, in British Dominions. The work was commissioned by twenty-six authorities, of which the chief was the Hydrographic Department of the Admiralty. In many instances the Hydrographic Department is the direct purchaser of the set of predictions; in others it acts as agent for the Dominions and Colonies and Port Authorities; there is also a system of exchanges with other countries.

The making of the tide-tables involves a prodigious amount of arithmetical calculation, much of which is effected mechanically by means of two calculating machines specially constructed for the purpose. One of these was built in 1906, for the late Mr. Edward Roberts, whose family for many years carried on a business of making tide-tables; it was purchased, in 1929,

by the Liverpool Observatory and Tidal Institute, and important modifications were then made in its design. The other machine was specially built in 1925 for the Tidal Institute. But the mechanical operations are only part of the process of accurate tidal prediction. Besides using the machines in the direct way intended by Lord Kelvin when he invented them, they are also used in an indirect way, devised by Dr. Doodson, the present Associate Director, to provide corrections to the results of the direct operation. Also, the details of these corrections are continually being improved after comparison of previous predictions with actual observations and by research into the causes of such differences as remain.

The resources of the Liverpool Observatory and Tidal Institute allow of a further considerable increase in the annual output of tide-tables, and in fact, more commissions have been received in 1935 than were received in 1934. Authorities responsible for improving the facilities of ports realise that an accurate prediction of the times and heights of high and low

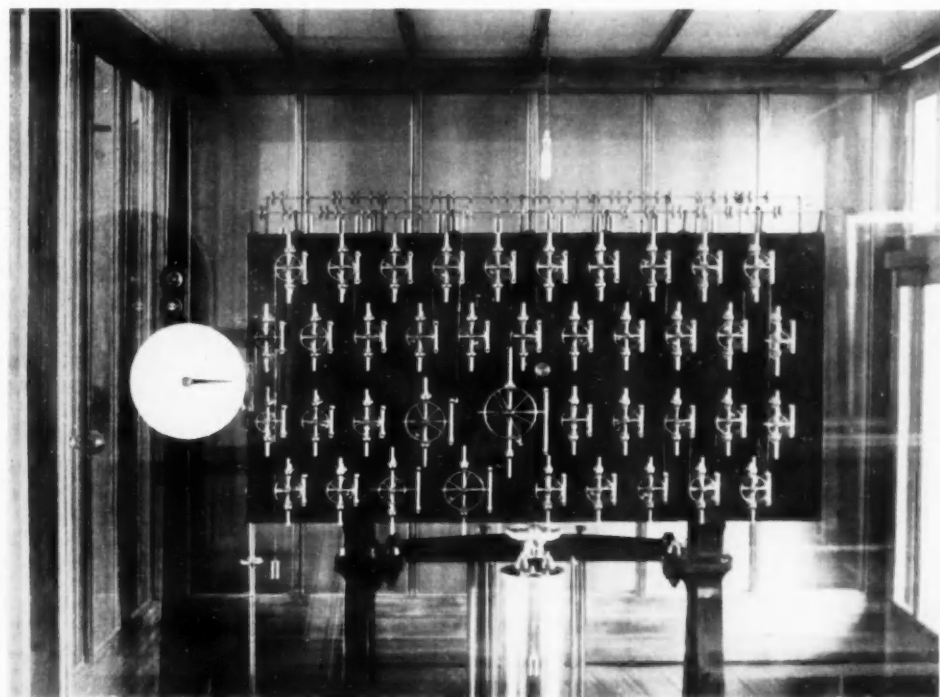


Fig. 2. Roberts Tide-predicting Machine.

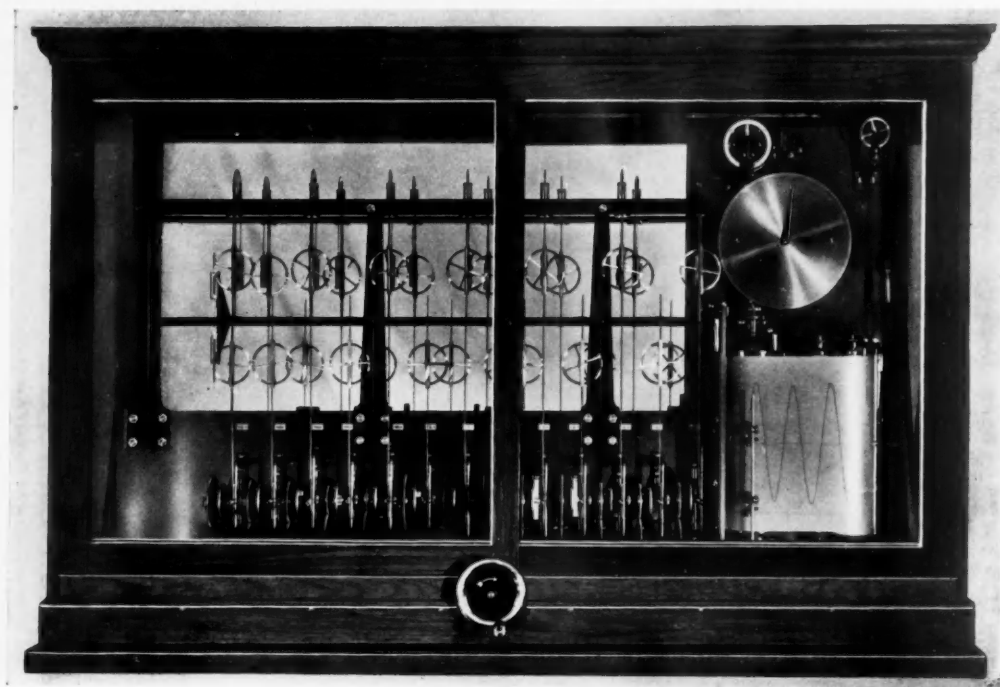
*Liverpool Observatory and Tidal Institute—continued*

Fig. 3. Kelvin Tide-predicting Machine.

waters constitutes one of these facilities. The costs are low, the highest being the preliminary one of installing a self-registering tide-gauge, whose records form the basic material from which predictions are made.

The illustration shows the registering part of a tide-gauge which is installed in the Observatory at Bidston. In this particular instrument the measurement of the height of water in the Mersey is transmitted electrically from a well near the entrance to the Alfred Dock, Birkenhead; but in the majority of tide-gauges used by harbour authorities, the recording part is placed directly over the tide-well and the record made mechanically.

The Observatory is managed by the Associate Director, Dr. A. T. Doodson, F.R.S., who has been in charge of the practical tidal work since the inception of the Tidal Institute in 1919. The institution has benefited from the active interest and collaboration of two members of its Governing Committee, viz., Commander H. D. Warburg, R.N. (Retired), who is Superintendent of tidal work in the Hydrographic Department of the Admiralty, and Captain F. W. Mace, R.N.R., the Marine Surveyor and Water Bailiff of the Mersey Docks and Harbour Board.

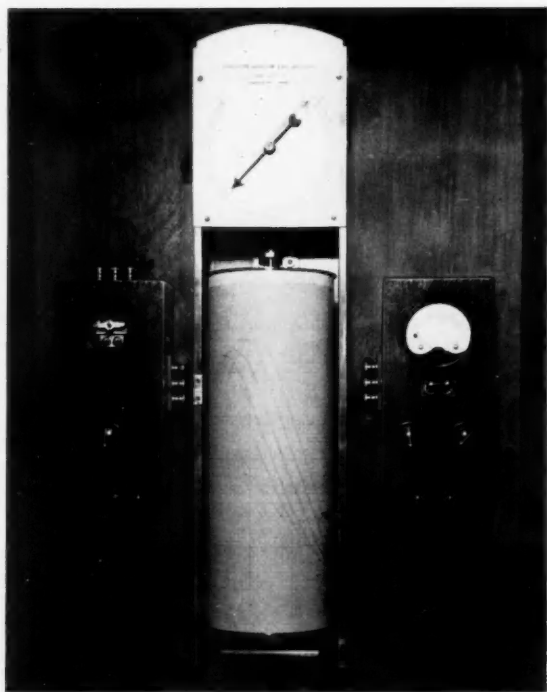


Fig. 4. Recording Portion of Observatory Tide Gauge.

The Director of the Liverpool Observatory and Tidal Institute is Dr. J. Proudman, F.R.S., Professor of Oceanography in the University of Liverpool; the Secretary of the Governing Committee is Mr. J. B. Roberts of the Dock Office, Liverpool.

Both the Director and the Associate Director have been the recipients of many scientific honours.

### Port of London Notes

#### London's Shipping.

During the week ended April 26th—836 vessels, representing 943,969 net register tons, used the Port of London. 463 vessels (769,841 net register tons) were to and from Empire and Foreign Ports, and 373 vessels (174,128 net register tons) were engaged in coastwise traffic.

Ten timber-laden vessels docked with 9,618 tons of softwood.

During the week ended May 3rd, 983 vessels, representing 1,093,882 net registered tons, used the Port of London. 489 vessels (803,605 net register tons) were to and from Empire and Foreign Ports, and 494 vessels (290,277 net register tons) were engaged in coastwise traffic.

Thirteen timber-laden vessels docked with 4,882 tons of softwood.

During the week ended May 10th, 1,092 vessels, representing 917,479 net register tons, used the Port of London. 472 vessels (739,311 net register tons) were to and from Empire and Foreign Ports, and 620 vessels (178,168 net register tons) were engaged in coastwise traffic.

Thirteen timber-laden vessels docked with 12,855 tons of softwood.

During the week ended May 17th, 924 vessels, representing 1,077,505 net register tons, used the Port of London. 491 vessels (880,534 net register tons) were to and from Empire and Foreign Ports, and 433 vessels (196,971 net register tons) were engaged in coastwise traffic.

Eighteen timber-laden vessels docked with 28,123 tons of softwood.

During the week ended May 24th, 1,135 vessels, representing 978,526 net register tons, used the Port of London. 487 vessels (776,566 net register tons) were to and from Empire and Foreign Ports, and 648 vessels (201,970 net register tons) were engaged in coastwise traffic.

Sixteen timber-laden vessels docked with 35,060 tons of softwood.

#### Tilbury Landing Stage.

During the month of April 41 passenger liners, totalling 358,931 gross register tons, used the Tilbury Landing Stage.